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The THERAPEUTIC GAZETTE

INCORPORATING

MEDICINE AND THE MEDICAL AGE

A Monthly Journal of Practical Therapeutics

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MEDICINE AND THE MEDICAL AGE.

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ORIGINAL COMMUNICATIONS.

THE USE OF DICHLORAMINE-T AND A MODIFIED OPEN-TO-THE-AIR TREATMENT OF BURNS.

BY CAPTAIN W. E. LEE, M.R.C., U. S. A.,
AND
CAPTAIN W. H. FURNESS, M.R.C., U. S. A.,
PHILADELPHIA.

The sterile scab, which in his fight against sepsis Sir Joseph Lister strove to attain as an ideal dressing for superficial wounds, would appear to be the perfect dressing for burns of the second and third degree; it would also in very large measure fulfil four of the six properties which have been stated by Stewart to be the essentials of any perfect dressing, namely: that it should be aseptic or mildly antiseptic; that it should provide free drainage; that it should not macerate the tissues; that it should not stick to the tissues; and that it should not require frequent changing. To these requirements, in cases of severe and extensive burns, must be added yet another, that the dressing should minimize the abnormal radiation of body heat from surfaces devoid of the natural protection of skin and subcutaneous tissues.

There has not been up to the present time any one dressing for severe burns which would fulfil all of these requirements and assist Nature in the formation of a sterile protective scab. The open-air treatment of burns, which, since the advent of the "ambrine" or of the paraffin-film treatment, seems to have been somewhat neglected, approached very nearly the theoretical or ideal conditions, in so far as the tissues were not macerated; the entire absence of dressings precluded any irritation of the granulating surfaces from adherent substances which had to be frequently removed; and by keeping the patient in an atmosphere warmed nearly to the body temperature there was the least possible radiation of body heat. Dusting powders such as stearate of zinc promoted rapid scab formation, but as no effective antiseptic could be used on account of the irritation thus produced the inevitably infected exudate collected under the scabs; adequate drainage was not possible, and this scab dressing had to be frequently removed. The results of this treatment were, however, quite as good as from any other method, and it had the additional recommendation of necessitating only infrequent and almost painless dressing. Due probably to a prolonged period of suppuration, the resulting scars were apt to be thick and inelastic.

The treatment with "ambrine," or any of the other paraffin-wax preparations, which aims at covering the burned area with a coating of impervious, aseptic or slightly antiseptic wax, fulfils several of the ideal requirements, but on the other hand it has some serious imperfections. This method is deliberately designed to prevent drainage, and consequently the wound secretions are accumulated under this impervious film of wax during the interval from one dressing to another, and the result is a pus poultice on the granulating surface and a maceration of the skin margins. The ambrine or the other solid wax preparations

which have to be melted and applied with a brush or spray have not thus far been made of sufficient antiseptic efficiency to maintain asepsis of the wound secretions.

In a series of over fifty cases of severe burns of the second and third degree treated during the past seven months at the Pennsylvania, the University, and the Germantown hospitals, we have employed a modified open-to-the-air treatment and have obtained a healing of such wounds with a surprisingly small degree of infection and a resultant promptitude of epithelialization followed by softer scars and less contraction than with any other method. We suggest, therefore, the following modifications, or rather additions, to an open-to-the-air treatment as worthy of trial:

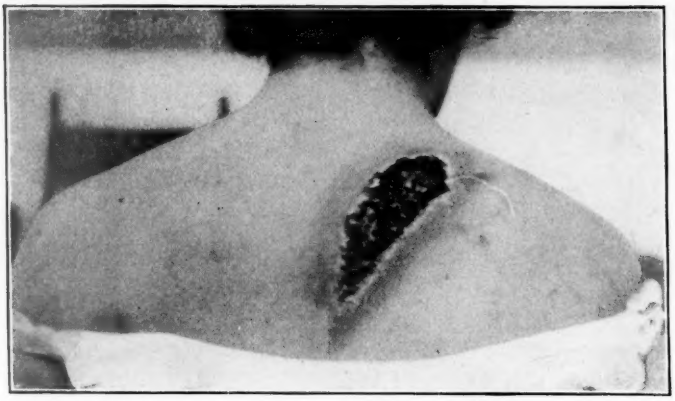
The entire burned area and a generous portion of the surrounding skin should be covered with a single layer of open-meshed mosquito-netting which has been previously impregnated with paraffin wax. This paraffined netting may be held in place with single layers of a circular turn of gauze bandage or by narrow strips of adhesive plaster applied over the edges of the netting and on the uninjured skin—never across a portion of the burned area. This paraffined net, being previously sterilized, furnishes an aseptic covering, but at the same time the large open meshes provide free drainage for the wound secretions; in other words, it acts in an effective manner as an ideal sterile scab. When the wound secretions are abundant and become thick and dried on the outer side of the net so as to hinder free drainage, the whole dressing may be completely removed, often without causing any pain, by simply lifting the nonadherent paraffin net from the wound surface. Should the paraffin net become so occluded as to adhere to the surface of the burn, then a liberal spraying with sterile paraffin oil (liquid petrol) from an ordinary atomizer will always loosen it.

The final requirement to be met in order to attain the ideal dressing is the antiseptic which will control infection and yet not devitalize or even irritate the tissues. We have found that a 1-per-cent or a 2-per-cent solution of dichloramine-T in chlorinated, melted paraffin wax—"chlorcosane"—according to the method of preparation proposed by Dakin and Dunham, can be used on the burned surfaces without causing the slightest deleterious effect on the tissues or discomfort to the patient, and with a pronounced control of the infection, as indicated by bacteriological counts made from smears of the exudates. This oily solution can be readily and evenly and painlessly applied in the form of a spray, at ordinary room temperature, to the entire burned surface before the paraffin net is in place, and at subsequent dressings every twenty-four hours, or through the meshes of the net if there is no necessity of removing it. For ward patients no additional outer dressing is applied over the paraffined net and the burned parts are exposed to the air as much as possible. When the burned area is extensive and there is danger of too great radiation of body heat, the bed clothing is raised above the injured part on a cradle on which two or three ordinary electric light bulbs are suspended and kept constantly lighted over the wound. Whether it is the equable temperature thus maintained or a direct action of the actinic rays we hesitate to say, but this electric light bath seems to have, unquestionably, a beneficial effect upon the healing processes.

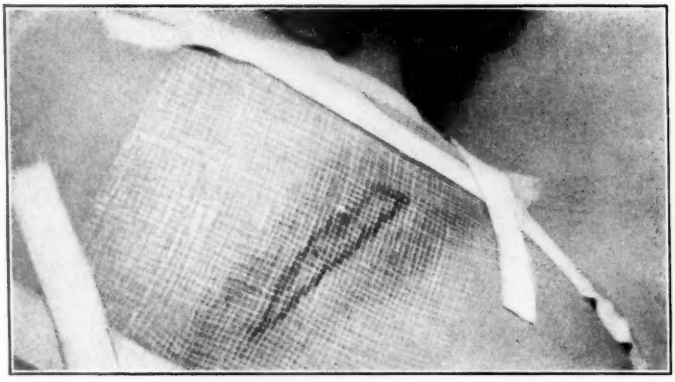
If the paraffined netting, which of necessity is somewhat stiff, does not conform readily to the contours of the affected area, it may be cut in short or narrow strips, as the case may be, and the wound thus paved over with it.

We have found the following method of making the paraffined netting produce the most satisfactory results:

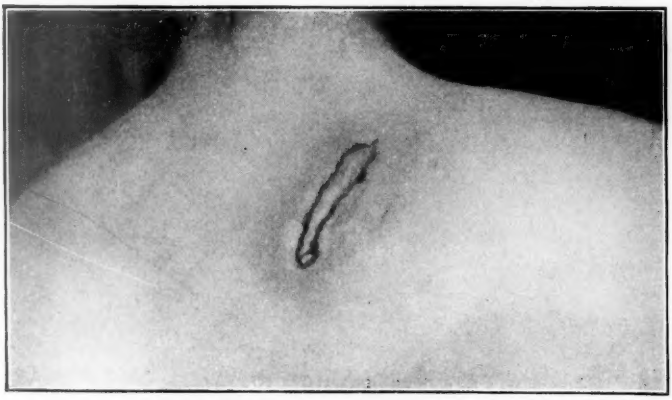
A good quality of mosquito netting with a mesh of about 1/16 inch is cut into strips four inches wide and six inches long; these strips are wrapped in muslin covers and sterilized in the usual way—steam under fifteen pounds pressure. As purchased this



Burn of six weeks' duration before treatment with Dichloramine-T.

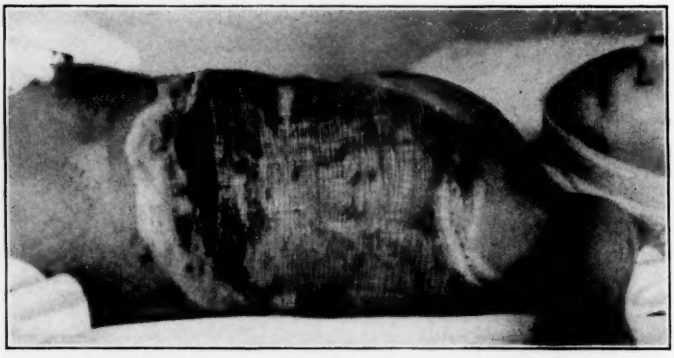


Paraffined netting applied over the burn.

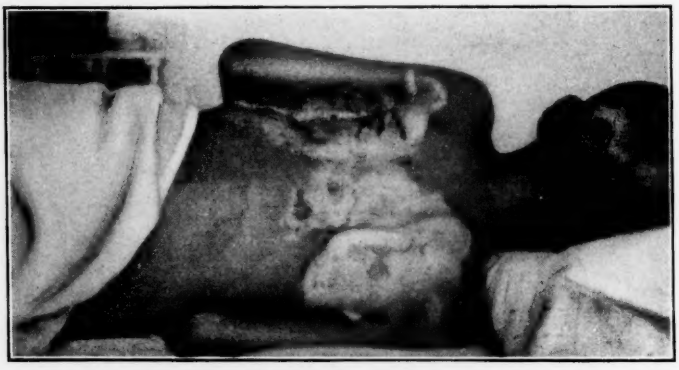


After 4 weeks' treatment with Dichloramine-T.

2d and 3d degree burn on a child's back, chest, abdomen, forearms, hands and face. 14th day after admission to hospital.



45th day—Same patient. Surface of wound was sprayed with Dichloramine-T in Chlorcosane through the meshes of the gauze. No other dressing. Patient kept under a tent and temperature maintained with several large electric light bulbs.



45th day. The same patient.

netting is starched or sized, and we have found it best not to wash out this sizing; if washed and dried the threads become fuzzy and absorb too much paraffin; the meshes are occluded and thus prevent drainage from the wound. When sterilized, these strips of mosquito netting are dipped into thoroughly melted paraffin wax, which has a melting point of 45° to 50° centigrade. The melting of the parawax should of course be done over a water-bath and preferably in a flat agate tray. The strips should be handled with sterile forceps and slowly drawn through the melted wax for about half a minute until every thread is thoroughly impregnated. They are then held over the tray of hot wax and allowed to drain out in the heat so that every mesh is clear. After this the strip is cooled for a few seconds in the air and again wrapped up in the sterile muslin cover and so kept ready for use.

WAR HEARTS AND THEIR MANAGEMENT.

BY THOMAS E. SATTERTHWAITE, M.D., LL.D.,
NEW YORK, N. Y.

In the physical examination of recruits, and in determining the nature of diseases in time of war, the heart and lungs are more embarrassing to medical examiners than any other organs of the body.

But there are unusual difficulties in the case of heart disturbances, under stress of war, as most of them are neuroses, and the particular cause in any individual instance may be hard to discover. For this reason special caution should be observed. The examination should be made in quarters where the temperature and surroundings are agreeable to the patient. He ought not to be allowed to remain long standing. Again, too much time should not be consumed in any one examination, nor, on the other hand, too little. In the one instance the patient will be unnecessarily wearied; in the other such information as will be gained may be unsatisfactory. If any one has seen a moving picture of recruits undergoing physical examination, he will realize that the performance is perfunctory, and that the results can easily be misleading. In fact, when the individual is in a weak and neurotic condition, as most of the cardiac cases are, a single examination may in many instances have little positive value; several should be made, with intervals of at least twenty-four hours between them. And even then the examiner may at times find himself very properly unwilling to give his final verdict.

For a very close scrutiny is requisite to enable an examiner to determine the cause of most of the neuroses; and yet without a clear-cut definition of the etiology in a given case the treatment must be tentative, so that the prognosis will be uncertain.

For example, Abrahams (*Lancet*, March 24, 1917) divides the war heart disorders into the following varieties:

1. Functional cases in men who had not previously been accustomed to much physical exertion; cases of poisoning by tobacco or drugs.

2. Organic diseases, such as compensated or uncompensated valve lesions; myocardial affections; adherent pericardium; and exophthalmic goitre.

3. The so-called "soldier's" or "irritable" heart, as indicated by the following symptoms, viz.: dyspnea, fatigue on slight exertion, lassitude, persistent tachycardia, and variable neurotic signs. Lewis has recently (*Military Surgeon*, April, 1918) called it "neuro-circulatory asthenia."

Abrahams believes, and it is doubtless true, that it is not always possible to differentiate the causes in this last group. Some of them may be due to infection, some to disorders of the ductless glands, others to some disturbance of the general

nervous system. He holds, however, that pure heart strain is impossible, even after the most violent exertion. But as a matter of fact we have both clinical and post-mortem evidence to show that the heart may be ruptured by excessive strain. Of course, if a heart has at any previous time been so injured, it will naturally be unable to stand the stress of military duties as well as a sound heart. This is admitted by Sir James Mackenzie (*British Medical Journal,* Jan. 22, 1916), but he thinks the percentage of this variety is small comparatively, as it certainly is.

In his experience with four hundred cardiac cases examined in coöperation with Dr. R. McN. Wilson (*ibid.*), he found that in ninety per cent the trouble was attributable to neuroses; and he is in accord with the late Weir Mitchell, who during our Civil War first described this condition under the general term "soldier's or irritable heart." The name "irritable" was given because the undue rapidity of the heart, now known as tachycardia, was brought on by overexertion. It is known also as "Da Costa's irritable heart."

The symptoms are as follows: Great vasomotor instability; a sense of fatigue or exhaustion; breathlessness on even moderate exertion; occasionally pain over the precordial region. Murmurs, systolic or diastolic. Sometimes an increase in the size of the heart. Frequently, irritability, mental depression, or indifference to surroundings. The causes, according to Mackenzie, are attributable to the nerve strain of life at the front, or to toxins, but he admits that he has based his views on clinical data only.

According to Parkinson and Koefod (*Lancet,* Aug. 18, 1917), however, cigarette smoking is an important contributing factor to the breathlessness and precordial pain of the "irritable heart." Examining twenty of such patients, he found in twelve an increase of breathlessness, though without a corresponding increase in the rate of respiration.

Confirming this deleterious effect of tobacco on the heart, D. J. Barry (*Lancet,* Nov. 17, 1917) has found that as the result of perfusing frogs' hearts with nicotine the rate of the organ was invariably slowed, while there was a tendency to its arrest, according to the strength of the nicotine used.

J. Clifford Allbutt (*British Medical Journal,* Aug. 4, 1917) holds that this heart is an example of "palpitation on effort," to which he has given the name "ponopalmosis" (from the Greek, meaning palpitation on effort). He believes with Mackenzie that myocardial strain, meaning rupture of the muscular fibers of the heart, is comparatively infrequent.

According to C. Aubertin, Chief of a Heart Service in the French Army (Soc. Méd. des Hôp. de Paris, *Military Surgeon,* 1917), many soldiers with mild functional cardiac disturbances that came under his care recuperated promptly, and were returned to the front. Patients with organic cardiac diseases, however, were assigned to light duty, or dismissed from the ranks. Of a recent series sent him, nine per cent were found to be really sound in health, while in twelve per cent the symptoms were traceable to incipient tuberculosis, alcoholism, anemias in the younger and fatigue in the older, all without actual organic heart disease. In thirty-two cases of tachycardia he found only three attributable to the thyroid. He sifted out almost all cases of organic valvular disease, returning to duty the few with slight aortic murmurs where tachycardia had developed, but only apparent after severe physical strain.

According to Stadelmann (*Berlin. Klin. Woch.,* Nov. 29, 1915), of men regarded as unfit for service, fifty to seventy per cent complained of their hearts. In these cases there were objective signs of heart disease in only about five per cent. The remainder were really suffering from neurasthenia.

According to Korach, in the same journal (May 17, 1915), of sixty men returned from the front on account of cardiac incapacity, twenty were found, after appro-

priate tests, able to perform their usual duties. The remainder (forty) had the following signs: precordial pain, palpitation, dyspnea after exertion, slight respiratory embarrassment, vertigo, and in some a tendency to faint. These cases were divided into two groups, according as they had organic or inorganic symptoms.

Hyperthyroidism, according to Sir James Barr (*British Medical Journal,* April 15, 1916, and *American Medicine,* September, 1916), may cause the "irritable heart;" and in the *British Medical Journal* of September 29, 1917, Hurst supports this claim, saying also that hyperadrenalism is another cause. The point made in these instances is that any strong emotion, such as anger or fear, will occasion abnormal activities of the adrenals or thyroid, those of the former being the most pronounced.

Barry (*British Medical Journal,* April 15, 1916) and Stoney (*Lancet,* April 8, 1916) hold that the irritable heart is almost always associated with *hyper*thyroidism. On the other hand, Sakai (*Journal of the American Medical Association,* May 20, 1916) believes there may sometimes be *hypo*thyroidism, as evidenced by a case of "disturbed pulse production, auriculo-ventricular automatism with marked bradycardia (pulse 42)," demonstrating an irritable condition of the vagus as a result of a lack of the normal thyroid secretion. These two views are compatible one with the other. Some proof of such deficiency was furnished by the fact that these symptoms can be relieved by injecting atropine, by baths and exercises, and by thyroid feeding. On the other hand, the symptoms of *hyper*thyroidism, as given by Barr, consist in tachycardia, cyanosis, cold extremities, slightly flushed skin, hypersensitiveness, slight widening of the palpebral fissure, at times slight enlargement of the thyroid; these symptoms being also commonly associated with deficient action of the suprarenals, low blood-pressure, and defective capillary circulation.

In hyperadrenia there is an increase in the general temperature, oxidation, and metabolism, with melanotic deposits. In hypoadrenia there is, on the other hand, loss of strength, heart weakness with diminished blood-pressure, cold extremities, with a tendency to vertigo or faintness, and heart failure. Hyperthyroidism and hyperadrenia are apt to be followed by hypothyroidism and hypoadrenia. Other symptoms of hyperthyroidism, according to Kahane (*Wien. Klin. Woch.,* Feb. 11, 1915), are loss of weight, tremor, abnormal sensations of heat, tendency to sweating and to diarrhea, restlessness and irritability, with a peculiar brilliancy of the eyes.

According to Bram (*New York Medical Journal,* Nov. 27, 1915), patients with thyroid disease are amenable to non-surgical treatment in 75 per cent of all cases. He uses quinine hydrobromide, iron, arsenic, phosphorus, and the suprarenal gland.

On the other hand, in such instances some recommend the *x*-ray or radium. The consensus of opinion appears to be, however, that while their action will at times be beneficial, they may aggravate the symptoms. The *x*-ray has caused death. All agree that rest and hygienic treatment should precede any form of treatment that may be dangerous to life.

As to operative measures, it should be remembered that other ductless glands are apt to be involved, so that the removal of the thyroid or any part of it may fail to reach the source of the disease. In case there is an associated thymus disease, as shown by the peculiar nodular growths in the mucous membrane of the upper air passages, or in the skin of the nose, with or without symptoms of obstruction, there is call for the removal of the thymus or a part of it.

It is manifestly important, therefore, in cases of irritable heart, to examine for the symptoms of disease of the ductless glands, so as to institute the proper remedial measures.

With reference to the use of cardiac stimulants, of which digitalis and strophanthus are the most important, it should be remembered that while the derivatives of

strophanthus are useful, caution must be exercised in the use of ouabain. If obtained from ouabaio root, and used in 1/1000-grain doses, it is marked in Merck's Index as exceedingly poisonous. There are some loose statements afoot as to the use of ouabain.

In the *British Medical Journal* of November 17, 1917, Jepps and Meakins, of the Medical Research Commission, have reported that as a result of examining the stools of sixty-five cases of amebic dysentery from the British Mediterranean forces, they found the entameba histolytica in twenty-four cases; the entameba coli in thirty-two; the lamblia intestinalis in twenty; the chilomastix mesnili in three; and the trichomonas hominis in one. Under treatment by emetine-bismuth-iodide, ninety-five per cent of the carriers were cured; and coincidentally there were a large percentage of cures of the "irritable heart."

According to Romberg's personal experience (*Münch. Med. Woch.*, May 18, 1915), heart disturbances at the German front were traceable to slight tonsillitis, bowel troubles, febrile catarrhs, pyorrhea alveolaris, incipient tuberculosis, and febrile cholecystitis. The various reasons given for the alleged physical incapacity were annoying palpitations of the heart, a sense of oppression in the precordial region, with sleepless nights and sudden dyspnea or even syncope after severe exercise. Curiously, he found the ordinary nervous cardiovascular disturbances less common in service than in times of peace. The men's minds were diverted from themselves. Acquired neurasthenia was therefore rare. Congenital neurasthenia was attenuated by the service. Excessive smoking, especially in those over forty, was, however, an important factor in the cardiovascular disturbances. Moreover, men with arteriosclerosis or syphilitic vascular disease contracted before the war, were apt to suddenly develop heart symptoms in service after special physical strain, and convalescence was slow, taking sometimes four to six months.

According to a recent German classification (*Military Surgeon*, Jan., 1917) there are four grades into which the recruit to be examined may be put. They are the following: Grade 1, in which those fit for service are placed. Grade 2, into which those fit only for a special kind of service are put. Grade 3, for those unfit at the time of examination, but capable of being made fit within a reasonable time. Grade 4 is for those unfit for any kind of service. In the third class fall the slight cardiac disorders.

The main symptoms of the irritable heart are as follows: Pulse rapid. The heart may or may not be slightly enlarged. Blood-pressure is always raised. A characteristic reaction is the so-called pilomotor: on moving the finger gently over the skin, "goose skin" immediately appears. Occasionally the hair will actually stand up at and around the spot pressed on. In about five seconds, however, this reflex fades away, to be replaced by a vasodilator reflex, as shown by a blush which may have a white border on either side. This blush may last several minutes. Sometimes there is excessive sweating, especially in the palms of the hands and soles of the feet. The hands and sometimes the eyelids are tremulous, and the patient excited and irritable. The eyes are often slightly prominent, and von Graefe's sign may be apparent. The thyroid gland may or may not be enlarged.

Recently the effect of poisonous gases on the heart has been described by Fiessinger (*Bull. de l'Acad. de Méd.*, Sept. 25, 1917). While there may be pulmonary, gastro-intestinal or nervous forms of gas intoxication, the heart's action may also be involved, the pulse-rate falling to thirty or even twenty-five, the heart sounds becoming weak. Blood-pressure will also often be low. During a period extending sometimes from three to six months, syncope may occur whenever the patient attempts to rise from his bed. Later, a return to the normal pulse-rate and amplitude may be expected.

The treatment of the neurotic group of cases which, as has been shown, consti-

tutes the great majority, should consist not only in attention to the neurotic condition, including the mental depression and indifference, but also to the physical side. As a prerequisite to success, the patient should at first be isolated, kept in bed, and not allowed to rise under any circumstances. As soon, however, as the nervous susceptibility has passed away, he should at once take graduated exercises. His food should also be nourishing, wholesome, and easily digested. Psychotherapy is helpful in these nervous cases, after a patient has physically recovered, but not until then. Theodor Schott gives his patients graduated and even gymnastic exercises. Such men may in good time return to the front; and in his experience there have been no relapses after this treatment.

In myocardial cases digitalis is usually given in small doses. According to Fiessinger, who has had twelve "cardiacs" at the French front, they were kept going with minute doses of a glucoside of digitalis three days in the week as a preventive measure, and for ten days at a time, with four-day intervals when compensation began to fail.

In gas poisoning, digitalis acts poorly, and resort must be had to such other remedies as the symptoms suggest.

I fully believe, and I say it after reading a report as to examinations for cardiovascular lesions and tuberculosis at the Plattsburg Training Camp (*Journal of the American Medical Association,* Dec. 22, 1917), that more time should be allotted than is the custom at present. When, for example, three examiners had each to pass on an average of forty-five men in a single afternoon, it seems plain that the period of time allotted was insufficient. I think that the judgment of our profession will sustain me in this statement, notwithstanding unusual ability on the part of the examiners, and even if all the examined were free from nervousness, as was naturally impossible under the circumstances. The higher administrative circles should see to it that ample time is given for this class of work; otherwise there may be unjust criticism of our medical officers.

CONCLUSIONS.

1. The stress of this war has brought into prominence some new phases of heart disorders.

2. The majority of these are neurotic in character, caused by physical injury, as sometimes in shell shock, or by emotions, such as fear or anger, causing disturbances of the secretions from the ductless glands. Other causes of these neuroses will doubtless be found.

3. Then there are the infections from toxins, of which the varieties are numerous. Many of these etiological factors may be common to the diseases of war and peace, as when the cause is a suppurative focus, of which pyorrhea alveolaris and mastoid disease are examples.

4. Then come the effects of chemical poisons, as from exposure to poisonous gases.

5. Myocardial affections, as the result of physical strain, occur in a comparatively small number of cases, and chiefly among the older men.

6. Success in treatment calls for both a close discrimination as to etiology and the carrying out of rational therapeutic measures.

7. Unfortunately, in some instances, it may not be possible to discover the etiological factor at first. Then a cautious tentative treatment should be undertaken. In this way a satisfactory diagnosis may usually be made.

8. If an operation of some magnitude is advisable, and the condition of the heart is a cause of concern to the operator, the patient should be prepared for the operation by a course of treatment of at least forty-eight hours. During this period the heart may usually be put in a proper condition for the strain. The remedy to be used should be either a cardiac stimulant or a cardiac sedative.

ON THE PRESENT TENDENCY TO NIHILISM IN DRUG THERAPEUTICS.

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The greatest and most significant fact in the history of modern medicine is the application to its problems of the scientific method; the method which investigates, observes, and proves before it accepts anything as truth, and which is always seeking for the ultimate causes of phenomena and deducing Nature's laws from observed facts and not from theoretical considerations. It is the development of this spirit which has raised our profession from the level it occupied in the days of the barber surgeons of the middle ages to the proud place which it holds to-day, and which, especially in the past half-century, has brought the science of medicine to formerly undreamed of heights.

Originally entirely an empiric art, little attention was given to anything but therapeutics, and that therapeutics based at its best on a mere empiricism, and at its worst on plain superstition. Its medicinal remedies were often composed of substances which had behind them not even experience, but were given on the same principle that doctors followed when they gave tiger claws, which were supposed to be beneficial by imparting to the patient the strength and qualities of the animal from which they came. Had medicine not been able to escape from this thralldom, it could never have developed, nor have advanced one step into the realm of Nature's secrets, and it is hard to overestimate the loss to humanity which would have occurred had we thus been deprived of the discoveries with which modern science has enabled medicine to bless mankind.

While all down the centuries from Hippocrates onward there were individual great men who had a vision of what might be attained, the new scientific era in medicine was enabled to develop primarily as a result of the work and writings of that great genius and wonderful intellect Francis Bacon, who laid down so clearly and convincingly the bases of inductive philosophy and pointed out the necessity of founding all opinion on observed facts. This man's service to medicine, and to all science, can never be overestimated, and his statue should be in the hall of every medical society.

"The beginning of all knowledge," cries Bacon, "is doubt." And, in the realm of his medical studies, the physician must always doubt until rightly observed facts, properly interpreted, finally justify belief. From Bacon's day (obit. 1626) onward, the demand that all knowledge be based only on observation has become more and more insistent, and from his time began the collection of that vast mass of carefully digested knowledge which is modern science and of which medicine is so important a part. Thus, as a result of his thought, we have evolved from the undiscriminating attitude of the middle ages, which accepted any explanation however impossible for the cause of any phenomenon however ill observed, and based its knowledege on deductive reasoning alone, until to-day our profession is submitting itself more and more to the discipline of Science and rejects, or accepts with reservation, all statements not scientifically corroborated.

In the sixteenth century men were willing to accept without investigation the fact that the Peruvian Indian used the bark of a tree successfully to cure chills and fever, and thus we learned to use "Peruvian bark," an untold blessing to humanity, and one of the best examples of that useful empiricism, from which have sprung so many of our best remedies.

In the nineteenth century the scientist Binz was not content with this clinically proven fact until he demonstrated the paralyzing effect of the alkaloid of that bark, which by that time investigators had isolated, on motile protoplasm, and then, when later Laveran discovered the plasmodium which causes malaria (this very name coming from a false theory) men *knew* why the Peruvian Indian cured his sickness with

the bark, and our therapeutics of malaria became truly scientific.

Again, in the olden days men were glad to produce sleep with poppy juice and henbane, and did not too much worry themselves with inquiring how they worked; in the nineteenth century the active principles of these and many other hypnotic drugs have been discovered, or are being investigated; we have studied their actions, their chemical formulæ, their pharmacology; and one chemist, the great Liebreich, from his knowledge of its molecular structure, predicted that chloral hydrate should have hypnotic action, which he proved clinically. Such examples show clearly the difference between the therapeutics of the sixteenth century, full of superstition, dominated by authority (from which last indeed our profession has not yet escaped), and that of the twentieth century, questioning everything, accepting nothing until it has been proven to the last experiment and controlled by a repetition of the tests. The old-time doctor was a Pragmatist. That "it worked," according to his or some other man's judgment, was all that he asked, or cared to know, about a drug. The modern doctor-scientist, taking as his motto "Causas rerum cognoscere," is unsatisfied unless he can delve into the fundamental facts that lie behind that "working" and can hold up to mankind the hidden causes of things, and is too prone to reject drugs whose value is clinically proven unless the laboratory can corroborate the bedside experience.

Our profession, always conservative, always slow to recognize and adopt new truths, a conservatism and slowness which is most fortunate in a calling that deals with human life, has at last come to realize that medicine is a science as well as an art, demands scientific proof for everything, and is indeed tending to go to the other extreme and to forget that medicine is also an art as well as a science.

The general effect of this scientific spirit is most happy. It has been a blessing to the doctor and to his patient. We now know where once we guessed; we diagnose accurately where we formerly surmised vaguely. We base our therapeutics very largely on proven facts, where formerly we were empiricists. But, as in everything else which is good, there has come with this great progress a tendency to carry things to extremes, which has its disadvantages.

The aim of pure science is the search for Truth. In trying to avoid being led into error in that great search it is skeptical of all that cannot be absolutely proven, and in the absolute sciences, such as mathematics and astronomy, this is essential. But, in a science-art like medicine, the wonders which science has revealed to us have made us forget that it is and will always be partly an art, and that, unlike mathematics, it can never hope to reach a day when it shall be based on absolute science, when all Empiricism shall have been banished, and when we shall dwell continuously in the cold, clear light which streams from the place where Pure Truth is enthroned.

Certainly, in the present condition of medicine, while we bow reverently to the dictates of real science it is impossible in therapeutics to demand of every remedy that it justify itself by unimpeachable experimental proof of its value, and were such a demand enforced there would be left to us few remedies which we could use.

In recent years, however, the growing demands of science have been such that many of the profession are unwilling to admit the utility of any remedy which cannot be backed up by laboratory proof, and this has created an excessive degree of distrust of drugs in the profession, which therapeutic nihilism we find everywhere. Some of our best and most scientific medical schools are training doctors who have little or no faith in any drugs, and, as skepticism is destructive and not constructive, sterile and not productive, the effect of these nihilists upon therapeutics has been most unfortunate, and their attitude may well be only less harmful to the profession than was the unlimited faith and the polypharmacy of our predecessors, who accepted unproven the mere statement

of some physician, or even layman, that such a drug would do such and such things. Such an attitude of extreme therapeutic doubt is, I believe, unwise. We must not go too fast, and though we may indeed dream of a time when our faith in the action of every drug in our Pharmacopœia shall be based on laboratory experiments, it is certain that such a day is yet far off. The number of really scientifically proven drugs is still few, and for a long time to come we must trust chiefly to careful bedside observation by well-trained men, which will always remain the final test of any drug.

In medicine, however interested we may be in the discovery of truth, *the final aim must always be the relief of suffering, the prolongation of life, the prevention and cure of disease,* and we must never let ourselves be so carried away by enthusiasm over scientific investigation as to forget this final aim.

When the desire to be scientific, which too often turns into the fashion of being scientific, breeds, as it can in some, a scorn for all that is not strictly scientific, it leads very soon not to a broadening of our outlook, as it should, but to a narrowing of it. It takes us away from the path of truth and clouds our vision by a dangerous self-satisfaction; a smug belief that we are being scientific, and brings its owners back insidiously to that worship of authority which in the middle ages prevented any intellectual advance, and from which mankind was freed by the skeptical, investigating spirit of the Renaissance.

How well indeed have men compared the path of truth to the movement of a pendulum; how the pendulum of human thought swings through the arc from the one extreme to the other; and for how short a time do we ever occupy that happy middle point, equally removed from either extreme! The facility with which scientific methods can be applied to the problems of pathology, etiology and diagnosis, and the greater difficulty of applying them to the problems of therapeutics, accounts for the greater advance of these former branches of our profession; and it is no wonder that some of our greatest and most influential teachers find, therefore, their chief interest in diagnosis, and are skeptical of therapeutics. Believing that there is nothing much that can be done to cure disease, they are prone to leave the patient to that wonderful "vis medicatrix naturæ" which so often and so well supplements our all too feeble therapeutic efforts.

In an art in which it is so hard to be sure that the results gotten are really the outcome of the measures we adopt, it is very easy to cry "Post hoc, ergo propter hoc," and so easily can this old logical error creep into medication, so hard is it to be sure that a given therapeutic effect is really the result of the use of the drug prescribed, so hard is it to exclude other possible causes, that it is usually impossible to convince such skeptics that any drug has any real effect. This type of physician is often seen in the German hospitals, where, after he has used every refinement of applied science in making a beautifully correct and keen diagnosis, the patient's natural desire for some therapeutic effort is quieted by a little compound tincture of cinchona, and he is left to the powers of Nature for a cure, while the diagnostician seems to actually long for a chance for an autopsy to prove the correctness of his diagnosis.

While good therapeutics must be based on good diagnosis, equally a diagnosis which cannot lead to a purposeful, effectual therapeutics is of little avail save to aid in prophylaxis. If the doctor is to be successful in helping his patient he must command an effectual therapeutics, and to do so he must have faith in his ability to help the patient, not merely because of the wonderful psychological and physical effect which hopefulness has on the sick man, a hopefulness which cannot possibly be successfully imitated where it does not exist, but in order that he may be able to mobilize his knowledge and to apply it for his patient's benefit.

Therapeutic skepticism paralyzes all the doctor's efforts. He must have faith in his

measures if he is to get results. The patient is not helped by the man who shows his little faith in and acquaintance with drugs by hemming and hawing and saying in a doubtful, helpless tone, "Well, we might do this or we might do that," all the time showing unconsciously to the patient that what he means is that we might as well do nothing. The sick man needs a doctor who earnestly believes that he can do something, and who sets actively to work to do it. If you doubt that skepticism paralyzes effort, recall how the virtue has left you in some desperate case when you have at last lost faith in its curability. As long as you believed that there was something you could do, you could bring hope and help to that sick-room; you could work and fight however desperate the malady, and could, at times, bring victory out of defeat; but when that faith was gone, when you felt there was nothing you could do, your resourcefulness was at an end and your only function was to register the hour of death and to comfort the family.

Let us indeed laugh at and avoid the polypharmacy of a past generation of doctors. We may justly ridicule their terrible mixtures, so largely based on inaccurate deductions, hearsay, and tradition, which were poured down helpless patients' throats; but we have cause to be anxious at the therapeutic helplessness and hopelessness of too many men in our profession to-day who have been taught to distrust all drugs, unless they are vaccines or serums which can be scientifically tested, and who, when they have made a diagnosis with skill and patience, are unable to suggest anything positive to be done. Vaccines and serums are some of the most wonderful triumphs of modern medical science, but every doctor who wants to be able to help his patients must also have a thorough knowledge of, and faith in, those older and clinically well-proven remedies from the animal, vegetable, and mineral kingdoms, which have saved so many lives in the past, and, rightly used, will do so in the future. By degrees, more and more of these older remedies will have their laboratory testings, which are so desirable; but we would be foolish indeed to reject as unworthy of our use many drugs whose value to us has been proven by years of bedside experience because the laboratory worker cannot prove their utility. Let us not forget that medicine made great advances and did wonders in healing before the pharmacological laboratory was developed.

While honoring the pharmacologist, and waiting eagerly for the results of his experiments, let us not think a drug unworthy of honor until he has passed upon it. What drug has had more abundant clinical confirmation of its value in all those conditions of intestinal putrefaction and fermentation and resultant gall-duct catarrh, which we call "biliousness," than calomel, yet the pharmacological laboratory tells us that it is not a cholagogue, and now many say that "biliousness" is not a clinical entity, and that calomel cannot help our patients in that symptom-complex of dizziness, headache, foul tongue, anorexia, etc., which is so common in springtime. Shall we then at once give up the use of calomel, or shall we rather be pragmatists, and, guided by common sense and a vast amount of bedside observation, continue its use to our patient's benefit though we cannot prove to the confirmed medical skeptic that it is the calomel and not suggestion which so uniformly brings us good results, and removes this disagreeable chain of symptoms?

No sensible doctor will hesitate long in such a case, or will throw over an old and tried therapeutic friend because it cannot bring with it laboratory credentials. After all, if he is convinced that a drug, in the modern slang, can "deliver the goods," it is not only his right but it is his duty to his patient to use it. There are many other remedies which have so far failed to pass the laboratory test, and yet in which the careful bedside worker has cause to have faith.

True, I can hear the pseudo-scientist, or the neophyte in the mysteries who has not yet learned reverence for the old by his experience of the fallibility of the new,

scoff at what I say; but the real scientist, he who has gone far enough on the great unknown sea of truth to have acquired a reverence for all truth, rather than that iconoclasm which a little science so often brings, will, I am sure, be the last to sneer.

In science all careful observation is respected, and the bedside is after all the doctor's final laboratory and his ultimate test-tube. What the doctor needs is not so much more laboratories as a more scientific use of his eyes and his ears and his other senses at the bedside, guided by the careful methods which the laboratory can so well teach.

What we need is a proper combination and correlation of the experiences gathered at the bedside with the experiences gathered in the laboratory; *but the final decision must rest with the bedside worker.* It may be difficult, or impossible, to prove scientifically that such and such a remedy has such and such an effect; but we must never relax our efforts to get such scientific corroboration of what the bedside has taught, or we will open the door to the old superstitions and empiricisms which did so much to hold back our profession. I am not ashamed to claim that careful, intelligent, oft-repeated bedside observation of the value of a drug by a well-trained doctor without any laboratory assistance is a proper and safe guide in therapeutics; and further, that a scornful rejection of any results that are uncorroborated by laboratory tests, which we so commonly see today in our younger laboratory workers, is as unjustifiable as it is unscientific.

To give an example of my point: Some years ago a laboratory worker presented careful data to show that pituitrin was valuable in pulmonary hemorrhage. As I have many such to treat, I felt it my duty to give it a bedside test. When, after many careful tests, I found it did not help me, I ceased to use it, since to help my patients is my first duty. On the other hand, when a number of years ago a careful, trained clinical observer told me that he had found that large hypodermic doses of atropine sulphate (gr. 1/33 to 1/25) hypodermically given would promptly check pulmonary hemorrhage, I gave it a trial and found it rarely failed me. Since then many years of bedside proof have convinced me beyond the possibility of a doubt that there is nothing quite so effectual in checking the majority of abundant pulmonary hemorrhages as this drug so given,* although the same laboratory which reported on pituitrin favorably reported on atropine unfavorably. These are but two examples of which there could be cited more. Unquestionably when a new remedy is suggested a discreet conservatism and a restrained skepticism is wise, but not such a skepticism as will preclude any investigation. Without such skepticism, with a mind too prone to take up and adopt each new remedy uncritically because it is the fashion, we would soon be overwhelmed with a mass of half-tried or ill-tried drugs, and we would fall back into the condition of our profession in the early nineteenth century. But to reject any remedy because it does not seem plausible to our minds is as absurd and unscientific as to adopt it without any investigation.

Even "old wives' remedies" have in them at times elements of value, though I could not but be amused at a medical friend who made a point of collecting all the "old wives' remedies" of which he could hear and trying them on his patients.

In the history of medicine innumerable drugs have been advocated and used—some for a short time, to be later dropped as ineffectual; others to become finally a part of our regular stock; others still have had periods of fashion and neglect; and, in later generations, doctors have rediscovered the value of some which were in earlier times rejected. Unquestionably there are far too many drugs, and our Pharmacopœia is overburdened with many useless ones. Polypharmacy is not a benefit to the profession, but I am also very sure that medicine will suffer if the present prevalent fashionable nihilism in drug treatment is to prevail. After all, at the bedside

*Not to be repeated under six hours, as it easily paralyzes the bladder and at times the intestines.

of some desperately sick patient, after the most accurate diagnosis possible has been made, after we have formed the most careful prognosis, there remains for us to fulfil the last and greatest duty of our profession —the formation of a rational, purposeful, and effective therapeusis.

The only safe thing is for us to steer a middle course between an undiscriminating conservatism and an equally undiscriminating radicalism, and it is a plea for such a middle course that I would make. I know very well what dangerous ground any doctor treads on who in these days, when science rules, dares to stand up and warn the profession against pseudo-science and an excess of skepticism. But while real science is always right and must be followed, much that is called science to-day will be proven in a few years not to have been science, its devotees not infallible, its dicta, as given out by them, not always final; and time has very often, with an indulgent smile, reversed them and shown the so-called scientific truths to be only the erroneous deductions of her fallible servants. Carried away as we all are to-day by the wonderful advances science is making, we need to go slowly lest our enthusiasm make us overshoot the mark, and I am very sure that such a word of warning as this is justified, that a little more faith in drug therapeutics is needed to-day by some of the very best men in the profession, and that there will be many good men and careful observers to say "Amen!" to my plea.

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INTRAMUSCULAR INJECTIONS OF QUININE BIHYDROCHLORIDE.

In an article in the *Lancet* of December 15, 1917, Fox recalls the fact that in the *Annals of Tropical Medicine and Parasitology* (June 30), issued by the Liverpool School of Tropical Medicine, in an article under this title Sir Ronald Ross is quoted as having written as follows:

"I really do not know why this form of medication is continued in malaria. It appears to me that the only cases in which intramuscular injection is called for are those in which intestinal absorption may be checked by very marked intestinal affections, or where patients are not to be persuaded to take the drug by mouth at all. For severe cases, to judge by experimental evidence, the subcutaneous injections are worse than useless."

It is with great diffidence that Fox ventures to disagree with Sir Ronald Ross, but the experience of many years' treatment of malarial fever in one of the Federated Malay States (Perak) is very much in favor of the intramuscular injection of quinine. This fact in the treatment of the more obstinate forms of malarial fever is recognized by all medical officers practicing in this part of the world. It is obvious that no one would exchange such a simple way of giving quinine as per os for a method which involves the boiling of the syringe, the solution, the sterilizing of the patient's skin, and the discomfort inflicted unless there was good reason for it. Patients, especially Europeans, have confidence in the intramuscular method and constantly of their own accord ask for it, as they have been taking quinine by the mouth in 10- to 15-grain doses daily with no good results. The hospital returns show that the prevailing type of malarial fever in Perak is subtertian. In 1916 in the various Perak government hospitals the microscopical examination of the blood gave the following admissions for malarial fever: Benign tertian, 1098; quartan, 202; subtertian, 4992; mixed infection, 198; type undiagnosed, 3370 (most of these cases had been taking quinine before admission, and no parasites were to be found in the peripheral blood). There were 599 deaths from the different types of malaria. The above figures do not include the many state hospitals existing in Perak.

The hospital routine treatment of malarial fever is as follows:

On admission to hospital, if subtertian parasites are found, 10 grains of quinine

bihydrochloride in 12 minims of water is given intramuscularly twice a day, until the pyrexia is controlled, generally in two or three days, when the injections are stopped, and 30 grains a day given by the mouth for fourteen days. Often the two methods are combined, but the trouble is to get the patient to remain in hospital after his temperature has been normal for one week. If he insists on leaving he is instructed to take quinine 20 grains for two weeks and then 10 grains for at least three months, but whether he follows this advice is extremely doubtful. Relapses are, Fox regrets to say, frequent, but this is probably due to reinfection (as parasites have again been found in the peripheral blood) as much as to inefficient treatment by quinine.

The recent excellent article, the "Diagnosis and Treatment of Malaria," by Captain David Thomson, published in the *Journal of the Royal Army Medical Corps,* wherein he recommends thirty grains of the bromide of quinine for three weeks, is more or less followed by Fox, but Fox has grave doubts whether his patients will be able to stand the 30-grain doses for so long as three weeks, as well as Thomson's did in Liverpool. Malarial gastritis is a frequent complication in Fox's fever-stricken patients. In the treatment of benign tertian 30 grains per diem by the mouth of the bihydrochloride for two weeks is the only form of treatment followed; it is found that quinine so given is sufficient to control the fever, but notwithstanding the continuous treatment afterwards by big doses, 15 to 20 grains, for months, his experience is that relapses in this type of fever are extremely frequent, more so than in any other form. In fact, he looks upon benign tertian as the most obstinate of relapsing malarial fevers. The intravenous injection of quinine is reserved for big subtertian infections with brain complications. In children and infants suffering from malarial convulsions quinine per rectum has been found satisfactory. Such is the treatment of the malarial fevers in Perak. A drug, however, is urgently needed to stop the relapses: galyl + quinine is now on trial, but too short a time has elapsed or too few cases been treated for any opinion to be yet formed.

In Perak they all look up to the intramuscular injection of quinine as the sheet-anchor in all obstinate and chronic forms of malarial fever, and generally find they have not placed their trust in vain. With careful asepsis no bad results have generally been observed. Occasionally an abscess has developed at the site of injection, but this has been due to faulty technique and sometimes to the low vitality of the tissues. In a small hospital in Taiping with 60 beds for Europeans, Eurasians, and the better-class Asiatics, 672 intramuscular injections of quinine were given during the last twelve months; abscess formation 4, tetanus *nil.* The quinine is injected into the gluteal region about one inch below the crest of the ilium, and is always given by a European sister or by the medical officer himself. The patient's name is entered in a special book, and the operator signs his or her name and is made responsible for any bad results. Figures for the other hospitals have not been obtained. How the intramuscular injection of quinine acts Fox is not prepared to state; perhaps it is due to a slow, continuous absorption of the salt or to an attack in the rear, the quinine getting into the blood current of the spleen and bone marrow easier from this direction. But in whatever way the results are obtained, until some other better method or drug is suggested or discovered the intramuscular treatment of malaria by the rank and file of the profession in this state will certainly be continued.

The treatment of malarial fever by 30 grains daily for three weeks, as suggested by Captain David Thomson, is no doubt effective in a non-malarious country; but whereas in the tropics reinfection is the rule, such happy results as he obtained in Liverpool cannot, Fox fears, be his lot. The obvious reply to this is to get rid of the mosquitoes—but this is another story.

EDITORIAL.

DECAPSULATION OF THE KIDNEY IN THE TREATMENT OF NEPHRITIS.

When Edebohls first suggested, twenty years ago, that incising and stripping each kidney of its capsule would prove advantageous in the treatment of chronic nephritis, the profession became intensely interested for obvious reasons, chiefly because nephritis in its chronic forms has been always a condition almost hopeless from the standpoint of therapy, at least so far as curative treatment is concerned. For this reason medical men were only too anxious to receive his recommendations favorably, although their radical character seemed rather startling, particularly when the grave systemic state of the average nephritic patient was considered. The advocacy of a radical operation seemed all the more bold because the average physician would not consider resort to this measure until every other method of treatment had failed, and, therefore, until the condition of the patient was so critical that the operation was resorted to as a gunner uses the last shot in his locker. Unfortunately, Edebohls did not live long enough after his first paper appeared to enable him to make studies of the cases which seemed to recover after the operation was performed, in the sense not that they recovered from the operation itself but that they recovered from the disease for which the operation was done. Nevertheless, he did report a quite large series in which operation seemed to produce a greater number of cures than are ordinarily obtained by medical means, and for this reason every surgeon in this country and abroad has, from time to time, employed the operation, with results which have been more or less conflicting.

When this procedure was first advocated by Edebohls we pointed out in these columns that it was hard to conceive how it could prove advantageous, entirely apart from the danger necessarily connected with severe operations upon those already desperately ill. We pointed out that it was the secreting epithelium of the kidney which had undergone degeneration, and that in many instances the renal parenchyma was so completely destroyed that recovery was impossible. Even if Edebohls's idea, that the kidney might attach itself to surrounding tissues and get a new blood supply, were to hold true, nevertheless such a blood supply could not be distributed to the secreting portions of the kidney in such a way as to regenerate destroyed cells or to provide that peculiar circulatory system which the kidney possesses. Many other writers, at that time and since, have condemned the operation for this reason, and Van Cott in 1904, writing upon the subject of kidney decapsulation from the pathologist's point of view, pointed out that no amount of restoration of renal circulation would restore integrity to the cortex, and expressed the belief that as chronic nephritis was a local expression of a general disease there can be no hope of arresting the progress of the renal degeneration. He asserted most positively that the diseased portion of the organ will never regenerate, and there is every reason to believe that his view is correct, for those who have reached adult life rarely, if ever, renew tissue after it has been destroyed by disease.

There is not space in this note to review all the literature which has accumulated in the last twenty years, much of which can be found in an excellent article which was contributed in August, 1917, to the *Journal of the American Medical Association* by Morse, who gives references to no less than forty-two papers and quotes many of the statements which these papers contain. On the other hand, it is interesting to note that no one can deny that good results have followed decapsulation of the kidneys in nephritis, when these cases show suppression of the urine and symptoms of uremia. The decapsulation may relieve renal tension, if there is congestion, and restore the function of the organs so that the blood

can flow more freely through them. Such a result, however, one would suppose to be comparatively brief in duration, and while manipulation of the kidney in the course of the operation is an aid in diminishing congestion, the effects of this manipulation can only be temporary. Neither in acute nor chronic nephritis can either procedure relieve the underlying cause of the disease.

From the papers which have been published up to this time, and, particularly, from the fair and excellent summary which has been presented by Morse, it would appear, to use his words, that decapsulation of the kidneys should be undertaken in acute nephritis only in those cases in which there is more or less diminution in the amount of urine and when symptoms of intoxication are developing.

Under these conditions Morse believes that it not infrequently is a life-saving operation, and in view of the clinical results which have accrued, although they contradict scientific deduction, he thinks that every patient presenting these symptoms should have the chance which operative treatment affords.

After quoting a number of cases derived from literature he sums them up by stating that out of nineteen cases of subacute or chronic nephritis on which decapsulation of the kidneys was performed, four patients died after the lapse of five, six, fifteen, and eighteen days; three patients are recorded as being cured after the lapse of four months, six months, and nine years; one case was considered cured in that the urine was normal and the patient seemed well for two years, when there was a recurrence, with a second operation, and death in six weeks; two patients were unimproved after five weeks and six months respectively; two were improved, one for a year, when there was relapse and death in two weeks; another improved but died of bronchial pneumonia after four months.

There is another classification in which it is stated that seven patients were symptomatically well, although the urine contained albumin and casts at periods of time amounting to four and a half months, six months, eight months, ten months, one year in two cases, and six years.

Although these statistics are not very encouraging, nevertheless Morse was bold enough to have the operation performed in four children suffering from chronic nephritis of the parenchymatous type, justifying his action on the ground that they were all going from bad to worse under medical treatment and, humanly speaking, would die in a short time. He says that, apparently as a result of the operation, two patients have been permanently cured, one of them being well with a normal urine after nine years and another after eight months. A third was well for two years and then died of acute nephritis. Another was well as long as it was under observation, but this period of observation was not long enough to permit definite conclusions. He cites nine others which have been so much improved by the operation that while he does not consider them as being cured of their disease, nevertheless a condition of months or years of apparent health has justified the procedure.

Evidently while Morse is thoroughly imbued with the reasons which may be advanced against this method of treatment, his clinical experience has made him a convert to it, for he states that he thinks it of much value in properly selected cases of nephritis in childhood, and that no child with acute nephritis should be allowed to die without giving it the advantage of the chance afforded by this operation.

In other words, Morse believes that the operation should always be considered in cases of chronic nephritis in childhood which are not responding reasonably well under medical treatment.

The paper which we have quoted does not tell us of the anesthetic that was employed, but Morse in a personal communication states it was ether. Theoretically, we would suppose that chloroform was the safer in that it is less irritating to the kidneys, although, of course, nitrous oxide might, under certain circumstances, be used with advantage in preference to ether.

Morse's views find sustenance in an

article in the *Edinburgh Medical Journal*, vol. ii, 1916, in which Burns described a case in a girl aged six years, who was admitted to hospital on account of "swelling of the body and eyes." Burns believes the indications for operation are: (1) Persistent dropsy; (2) uremia; (3) excessive albumin; (4) suppression or persistent and notable diminution of the amount of urine voided. This type of case is acute nephritis or chronic nephritis with acute exacerbations. The best results appear to occur in chronic parenchymatous nephritis in which there is marked anasarca. In his particular case operation was justified by the following points: (1) Failure of a long course of medical treatment; (2) marked dropsy; (3) high amount of albumin; (4) diminution in the urine voided; (5) age of the patient. Operation is contraindicated in (1) cardiovascular disease; (2) patients over fifty years of age. The results of the operation are in keeping with those found in general in such operations: (1) Disappearance of dropsy; (2) increased secretion of urine; (3) great diminution in albumin. After operation there is transient anuria; then in about ten to fourteen days polyuria sets in. In about a month there are decided signs of improvement, which improvement is gradual. Whether permanent cure is established is doubtful, but there is great amelioration of the symptoms. Burns agrees with Morse that the anesthetic employed should be ether.

QUININE AND MALARIAL FEVER.

During the last year, or eighteen months, we have discussed this subject in its various aspects on a number of occasions, dealing with the danger of prophylactic doses of quinine in respect to the development of an immune strain of parasites and with the question of the relative safety and efficiency of the intravenous injection of this drug when compared to its administration by the mouth. It will be recalled that in one leading article we drew attention to the excellent results obtained by several surgeons in the Medical Corps of the U. S. Navy who resorted to the intravenous method, giving the strength of the solution which they were in the habit of employing. Again, we quoted the exhaustive communications made by Thomson to the *Journal of the Royal Army Medical Corps* of England, in which he reported the researches which he had made in Liverpool concerning the influence of quinine upon malarial parasites, the patients, of course, being individuals who had acquired their infection in foreign parts.

In a later issue of the *Journal of the Royal Army Medical Corps* Thomson makes still further contribution to this important subject. After pointing out that the intravenous route for the administration of quinine in malarial fever has hitherto been recommended almost exclusively for emergency cases, notably for those suffering from what has been known as "pernicious comatose remittent," he proceeds to emphasize the fact that this method of administration has other and quite special advantages to recommend it. Thus, it is the only route by which one can concentrate upon the parasite and thereby obtain the maximum effect at the optimum time.

Thomson then proceeds to give us the technique which he has employed in fifty cases of malaria to which the bihydrochloride of quinine was given intravenously during the active stage of the disease. The strength of the solution which he employed was twenty per cent. This was made by dissolving an ounce of quinine bihydrochloride in four ounces of normal saline and then increasing the solution up to five and a half ounces by the addition of more saline. If the bihydrochloride solution was found after this dilution to be strongly acid, the acidity was reduced by minute quantities of sodium bicarbonate, for it seems that there is some difference in acidity in the various samples of bihydrochloride. The solution is heated until it boils, and is kept in a well-stoppered sterile bottle protected from direct sunlight. If it is not absolutely clear it is passed through a sterilized cotton-wool filter, and each dose is again brought

to the boil before being used. One cubic centimer of the solution contains three grains of quinine bihydrochloride. In this connection it is worthy of note that bicarbonate of sodium when boiled is changed into carbonate of sodium, but as the injection is given intravenously and the amount of carbonate of sodium is exceedingly small, this factor can possibly be ignored.

Thomson is one of those who believe that the comparatively strong solution of quinine which he suggests is not deleterious in its effect upon the recipient, if the injection is given so slowly that the solution is diluted by the circulating blood. Indeed, the use of these strong solutions avoids the danger which arises from the injection of large quantities of fluid which may contain, although sterile, bacterial proteins, or other substances which result in the development of untoward symptoms.

MacGilchrist insists that strong solutions are dangerous, and that great dilution, as much as 1:150, is necessary in order to avoid the dangers peculiar to quinine. This would result in the use of two or three pints of saline for every seven grains of quinine injected. We can see no reason why, if the injection is dribbled into a vein in which there is free circulation of blood, the stronger solution should not be employed. While it is quite true that quinine, when given in a concentrated form, is a cardiac poison, it possesses no such properties when sufficiently diluted.

Thomson's method consists in selecting a good-sized vein, inserting a sharp fine-bore needle, being assured that its point is in the lumen of the vessel by slight withdrawal of piston of the syringe, which shows blood. This is followed by the slow injection of the solution. The patient should be in bed on his back. The skin is sterilized with iodine. The use of a fine-bore needle prevents the injection from being given rapidly, unless the operator deliberately uses too great force. From twenty seconds to a minute and a half should be the minimum time for the injection of each cubic centimeter.

As with the U. S. navy surgeons, so with Thomson, he finds that after the injection of from six to nine grains of quinine bihydrochloride the patient experiences singing in the ears, and other symptoms due to quinine develop. He has never given less than nine grains nor more than fifteen grains at one dose. Before withdrawing the needle the piston of the syringe may be slightly withdrawn in order to bring a little blood into the needle, thereby protecting the skin in the act of withdrawal from the drop of quinine solution, which, otherwise, might irritate it. The spot which has been punctured is touched with tincture of iodine and no additional dressing is needed.

The advantages of intravenous injections over intramuscular injections are that there is no soreness, that we are sure of the contact of the quinine with the parasites, and an area in the tissues is not produced in which the spores of tetanus, if they gain access to the body by any pathway, readily grow. In over one hundred injections Thomson has never had any ill effects, except in two instances. In one a rather acid solution was employed and produced a mild subacute local phlebitis, which entirely subsided in two or three days. The other was a cardiac patient, with unhealthy vessels, and a rather small vein had been used.

It is possible, Thomson thinks, that in case of cardiac disease intravenous injection may possess dangers which will contraindicate its employment. Of course, idiosyncrasies or undue susceptibility to quinine might in some individuals develop sharp symptoms. In concluding this part of his paper Thomson uses the following words:

1. The intravenous route has special advantages in the treatment of malaria during active (as distinguished from quiescent) periods of the disease. By this route, and at these times, the full quantity of quinine given can be concentrated against the parasite at the moment when it is most susceptible to its action; and the maximum effect of the drug, within therapeutic limits, can thus be obtained.

2. By attention to a simple technique,

quinine bihydrochloride in twenty-per-cent solution can be safely and conveniently given intravenously up to fifteen grains of the salt for a dose—a five-cubic-centimeter syringe and suitable hypodermic needle being the only special apparatus required.

3. In eighteen consecutive cases of malignant tertian with remittent fever and with ring forms of *P. falciparum* present in the peripheral blood, a single intravenous injection of fifteen grains of quinine bihydrochloride in twenty-per-cent solution was sufficient to break the attack in every case; and once the attack was broken doses of quinine by the mouth which had been insufficient to reduce the temperature were now sufficient to keep it down. Ring forms of the parasite quickly disappeared from the circulating blood after the injection, but crescents were not directly affected.

4. In all these cases of malignant tertian with remittent fever the intravenous injection was given as soon as ring forms of *P. falciparum* were found in the peripheral blood—*i.e.*, as soon as the true nature of the fever was known.

5. In thirty-two consecutive cases of benign tertian a single intravenous injection of twelve grains of quinine bihydrochloride in twenty-per-cent solution given during a paroxysm was sufficient to break the attack so that the paroxysm next in order did not occur. This was so even in those cases in which a quotidian type of fever was to be expected.

6. All stages of the schizogonous cycle of *P. vivax* present in the circulating blood were directly affected by the injection, but not to the same extent. The young forms before they pass the ring stage were most affected, then the actively ameboid forms, and others apparently in proportion to their nutritive activity. Gametocytes were the last forms of the parasite to disappear from the peripheral blood.

7. The mature gametocytes of *P. vivax*, unlike those of *P. falciparum*, disappear from the peripheral blood under the direct action of quinine bihydrochloride given intravenously.

8. In cases of benign tertian, the patient's comfort will be considered without the parasites being spared if the first intravenous injection be given at the very end of the hot stage. Subsequent intravenous injections should be timed to be given at what would have been about the beginning of the hot stage in the paroxysms next in order had the cases remained untreated.

9. The intravenous injection of a twenty-per-cent solution of quinine bihydrochloride in normal saline in the doses and at the times stated can be relied upon to break promptly an attack of malaria; and although immediate sterilization or even sterilization after any single course of treatment in cases that have already relapsed several times is not to be expected, it is reasonable to suppose that, if each relapse is cut short on the day of onset, the patient will stand a much better chance of ultimate sterilization. The shorter the time that the parasite is allowed to go on multiplying the less will be the risk of secondary changes, also the greater will be the chance of quick and sure destruction of the parasite, and of complete recovery.

MINOR, BUT NEVERTHELESS MAJOR, POINTS IN CONNECTION WITH ANESTHESIA.

For many years the writer of this article has been fully aware of the fact that the side effects of drugs used for the production of surgical anesthesia were not sufficiently studied and recognized, and adequate measures were not taken to avoid disagreeable or dangerous after-effects. Thirty years ago he carried out a series of observations upon patients who received ether as an anesthetic and found that invariably its administration resulted in a loss of body heat with the consequent fall of temperature, which, in some instances, was sufficiently great to be distinctly dangerous in itself. At about the same time Barker, a London surgeon, made similar observations in University College Hospital. Since then a very large number of papers have appeared, and furthermore the relationship

between shock and the action of the anesthetic has been fairly thoroughly studied.

Without doubt the most important point which has developed in the use of general anesthetics has been the recognition that these drugs should be so used that the patient suffers no pain, and yet is so little submerged below the surface of consciousness that only a few minutes suffice on the withdrawal of the anesthetic to bring into play some of the factors which are obliterated when the patient is completely anesthetized. The consequence is the patient who seems in jeopardy can be called back within a comparatively brief time, a long period of anxiety is saved to the operator, and the patient does not have to be harshly treated in the effort to revive him.

We believe that measures taken to conserve body heat during the administration of an anesthetic are still often lacking. At times the patient is well wrapped in blankets, but if the operation is to be performed upon the middle zone of the body, these blankets are rolled up, or down, and not infrequently hang heavily across the thorax, or even across the neck of the patient, who is unable to resist their pressure voluntarily during the relaxation induced by the anesthetic, while, at the same time, that portion of the body which is most susceptible to cold, namely, the abdominal viscera, is exposed to an atmosphere thirty degrees below internal body temperature. Such exposure can be largely avoided by covering as much tissue as possible, leaving only the zone to be operated on exposed to the eye and air. Conversely care should be taken that nurses, stimulated to activity in regard to the maintenance of heat, although they may be warned against producing burns by external applications, may, nevertheless, greatly oppress the patient by the too free use of hot-water bags and induce a condition closely allied to heat-stroke.

An interesting paper dealing with these minor, yet major, points in connection with anesthesia was read not long since before the Los Angeles County Medical Society by Miss Florence Henderson, who reported upon an experience in twenty-two thousand cases of surgical anesthesia. There are a number of excellent practical points in her communication. She notes, first, that while each method of inducing anesthesia has its enthusiastic advocates, it is obvious that no method now employed can be honestly styled ideal, and the very fact that so many novelties are competing for popularity is, as she points out in the *Southern California Practitioner*, proof of the absence of a thoroughly satisfactory anesthetic. We note with interest in the Mayo Clinic, where we understand she has had her large experience, they have come to the conclusion that the simpler the anesthetic the better, consequently they do not employ any of the various combinations of gas-oxygen, gas-oxygen-ether, or chloroform-ether, but use ether by the drop method, which every one has found is advantageous. The credit for the introduction of this plan belongs to Dr. Oscar H. Allis, of Philadelphia, who by his introduction of the Allis inhaler, at the Jefferson Hospital many years ago, proved that the old saturation method produced many difficulties which the drop method avoids. A little more ether may be used, but a great deal less anxiety is suffered by the surgeon and less discomfort by the patient. The drop method, so-called, may, however, through a misunderstanding in technique, not be the drop method at all. It does not suffice simply that the ether shall drip drop by drop, but that each drop shall be taken up from the inhaler by the patient as it is dripped, drop by drop. Dropping ether rapidly upon many layers of gauze, so far as the patient is concerned, is equivalent to pouring it on the gauze in the old way and soaking the patient with it, and, as Miss Henderson well says, there should always be sufficient air with the ether to keep the color pink.

Again, we note with much pleasure her comments upon a point to which we have constantly referred in these pages in past years, namely, the error of hurrying the production of anesthesia. Not infrequently when there are many cases to be operated

upon in a general hospital the anesthetist feels pushed by his chief to have a patient ready at a given moment. This is emphatically illustrative of the old adage "the more haste the less speed," since pushing the anesthetic, while it may hurry the patient into the operating room, is apt to cause so many disagreeable symptoms as in the end to produce definite delay and real loss of time. This is particularly important if the patient is either feeble or toxic, and an excess of ether increases the amount of mucus which is secreted in the upper air-passages and so makes another complication. In operating upon the intestines or upon the gall-bladder it should be remembered that not infrequently the manipulation of these parts results in the regurgitation of some of the intestinal contents into the stomach, which, in turn, may be regurgitated into the mouth, and if the anesthetist is not on the watch and the patient is very deeply anesthetized, the latter may be drowned in this fluid or suffer from a septic pneumonia later on.

Again, we note with much interest that the experience of the writer whom we quote is to the effect that an anesthetic, such as ether, if properly given, is less dangerous to a patient than the performance of the operation without an anesthetic; and, again, along this line, she states that unless the heart is badly damaged and dilated ether can usually be safely employed in operations upon the thyroid. In these cases one-sixth of a grain of morphine and one-one-hundred-and-fiftieth of a grain of atropine given thirty minutes before the operation allays nervousness, prevents undue secretion of mucus, and permits the administration of ether with plenty of air, provided it is not pushed.

Perhaps one of the most remarkable statements made is that in certain badly afflicted pulmonary cases (*sic*) ether is not only tolerated but appears to have quite a specific beneficial effect, and Mikulicz is quoted as having stated that he had seen more pneumonia follow local than general anesthesia.

Additional points of interest are the necessity of seeing to it that the patient after the operation is not put back to bed in a gown which is wet with perspiration, which is often profuse when ether is freely given.

Last of all, we are glad to see that the writer notes the importance of the personal and human element in the administration of an anesthetic. The anesthetist should gain the confidence of the patient before beginning the administration of the drug, and should do everything in his power to lead her to believe that the ordeal is not as severe as she fears. A cheerful demeanor and mental comfort does much toward making the period of anesthesia quiet and devoid of evil after-effects. Too often the surgeon, with his mind centered upon the difficulties and gravities of the operation, and being accustomed to seeing many people under an anesthetic, ignores the psychic side of the problem before him, and while the area of operation may be successfully treated, the mind and nervous system of the patient may suffer to a degree which requires many more weeks for convalescence than it takes for the wound to heal.

CHEST WOUNDS.

The observation has frequently been made, and this in all departments of war surgery, that the experience acquired in the immediate treatment of wounds of a given nature and of a given region—for instance, those of the chest—may differ widely from that of a later period. This is accentuated by papers by Rees and Hughes (*Lancet,* Jan. 12, 1918), whose contribution is based on some 500 cases of chest injury which have passed through their hands at the advanced operating center, and upon the paper of Crymble (*British Journal of Surgery,* January, 1918), whose work for more than two years has been in base hospitals and whose study includes 211 cases seen there.

Rees and Hughes classify their chest wounds into leaking and closed—the former

meaning wounds of such size or so placed that air passes in and out with the movements of respiration. They note the majority of leaking wounds close within twenty-four hours; that the usual cause of death is primary hemorrhage during the first few hours after the receipt of a wound of the chest. This hemorrhage is practically always from the vessels of the lungs and not from those of the parietes, and therefore plugging to stop bleeding is futile and indeed distinctly harmful. The treatment of the bad cases is mainly expectant, using morphine or heroin to ease pain or restlessness. They particularly caution against handling or rolling the patients on the side. It is worthy of note that out of 100 penetrating wounds of the chest only 65 gave symptoms of hemoptysis.

The mortality of pneumohemothorax was 61 per cent. Of those who survived hemorrhage and shock more than half became septic, and more than half these septic cases died. The chances of the bullet wound remaining clean are about half and half; of the shell wound about one in three. As to the leaking cases, sewing the wound with or without the removal of the foreign body seemed to be the wisest and safest procedure. The suture should be a rapid one, the operative procedure reduced to its minimum.

The authors state that if the pleural contents do become infected these sutured wounds will become moist in forty-eight hours and discharge, in which case the stitches are removed and a tube inserted for drainage. The main object of this procedure is to close the pleura.

In cases of hemothorax and closed pneumohemothorax the mortality was about one-fourth that of leaking pneumohemothorax. The signs of infection should be watched for, but may not develop for several days. As indicative of infection the pulse remains rapid, the temperature does not begin to fall as it should do in three or four days in an uninfected hemothorax, and the patient complains of tenderness on percussion over the affected part of the chest. After the second day aspiration should be done whenever there is effusion enough to cause cardiac displacement of an inch or more. The tendency has been to do this operation more frequently as experience has shown its value. The fluid should be drawn away slowly. All these cases of closed pneumohemothorax require aspiration, and a specimen withdrawn should be sent to the laboratory for bacteriological report, which if positive indicates resection and drainage. If the fluid drawn be offensive resection and drainage should be performed at once.

As to collapse of the lung, this is Nature's own way of arresting hemorrhage, and if it did not occur the patient would bleed to death. A massive collapse may occur on the wounded side when there is very little hemothorax and no raised intrathoracic pressure, and it also is fairly common on the unwounded side. There are two factors which may assist in the process: those due to cessation of the movements of the diaphragm, or to blood-clot completely blocking a main bronchus. In collapse with little or no effusion and not due to hemothorax the heart will be pulled over to the side of the collapsed lung. In those cases bronchitis and bronchopneumonia and pleurisy are common.

Crymble has devoted himself particularly to the *x*-ray studies and observes that a high immobile diaphragm is the usual result of a wound of the chest. As to the location and removal of foreign bodies, the latter process is advocated after proper location, the author stating that they are readily palpated in the lung, and for access, advising resection of two inches of the rib. He observes that fluid in the pleural cavity gives rise to opacity; that gas and fluid give rise to a very characteristic picture, since a sharp horizontal line marks the junction of the opaque fluid with the transparent gas. In the radiograms of a massive collapse taken in 15 cases, in 10 of which the collapse was on the side opposite to that injured, the lower lobe was as a rule unaffected. The picture shows opacity of the lung area, associated with a high and immobile diaphragm and with retraction of

the mediastinum toward the opacity. In hemothorax the *x*-ray showed a high, immobile diaphragm; in pneumothorax it showed obvious outline of a collapsed lung, with a clear area lateral to the lung and all the diaphragm with absence of lung mottling.

As to the other diagnostic means of recognizing abnormal conditions within the thorax following gunshot wound, these are applied in accordance with long-established surgical principles. The question of the removal of foreign bodies from the lung substance itself still must remain *sub judice*. There is a large evidence to the effect that this may often be harmful; a still larger that many of them may be inaccessible, some to the effect that when carefully located and in an accessible portion of the lung their removal is in selected cases clearly indicated. Perhaps Moynihan is the ablest and most enthusiastic advocate of this latter procedure, one which is justified by a now steadily accumulating successful experience in the hands of many men. Again, as is true of other parts of the body, drainage is to be avoided as a preventive of infection, but freely used when the latter develops under tension. The lung and the pleura have not proven themselves less resistant to infection or more susceptible to trauma than other parts of the body. The pleura if treated with due consideration seems as well endowed with self-protective powers as the peritoneum, or the synovia of the knee-joint, and it is obvious that intrathoracic surgery, for both the acute and chronic conditions, is in the rapid process of making.

SHOCK.

This, one of the major problems of war, has been subject to an intensive study upon the part of clinicians and laboratory men. Although it is probably true that no revolutionizing treatment has been discovered, there has been a certain formulation of methods long since recognized as of wide application, and a rejection of drugs regarded as distinctly hurtful by surgeons who have given the matter careful study. Thus in all the contributions it is noteworthy and most gratifying to find an active absence of combinations of strychnine, camphor oil, atropine, or other alkaloids, and a general agreement as to the value of morphine when shock is attended by severe pain or great restlessness without dyspnea. There is universal agreement as to the beneficial effects of rest, quiet, external heat, and head in low position; a not unanimous verdict as to the value of normal salt solution, Ringer's solution, hypertonic salt solution, and bicarbonate of soda; one or two voices strongly raised in favor of rebreathing, forceful breathing, and CO_2; a universal recognition of the value of transfusion as a means of raising and maintaining blood-pressure at the increased level.

It is interesting to note that in the report of the Special Investigating Committee appointed by the Medical Research Committee of Great Britain in August, 1917, to undertake the coördination of inquiries into surgical shock and allied conditions, with a view to a better correlation of the laboratory and clinical observations (*Journal of the American Medical Association*, Feb. 23, 1918) Fraser and Cowell have devoted themselves for over two years to the reading and recording of blood-pressures in a variety of wound conditions. They report satisfactory results from the intravenous use of hypertonic solution, consisting of sodium chloride 2 grammes, potassium chloride 0.05 gramme, calcium chloride 0.05 gramme, and water 100 Cc.

They also secured pressure which was maintained by the injection of calcium chloride 0.075 gramme; sodium chloride 1.325 grammes; gum acacia, 2 grammes; water, 100 Cc.

Fraser and Cowell have changed this slightly, giving less sodium chloride and more calcium chloride and leaving out the potassium salt entirely. They record good results from the use of 15 to 20 or even 30 ounces of the solution given intravenously. The solution was given slowly, at the rate of 5 ounces in five minutes, and its heat maintained at a temperature of

about 120° F. in the reservoir. It was repeated if necessary in twelve to twenty-four hours.

Direct blood transfusion, as could be expected, caused an immediate and persistent rise of pressure. As to heart drugs, such as pituitary solution, epinephrin, caffeine, camphor, etc., the authors state there is not sufficient evidence to show that one of these drugs takes precedence over the others. They conclude their paper by commending direct blood and calcium hypertonic gum solution injections. Physiological sodium chloride solution is regarded as unsatisfactory. They also hold that the observation of pressure during the first weeks of convalescence affords an excellent index as to the prognosis, steady rising or maintaining of high pressure being of course favorable.

Cannon, Fraser and Hooper have particularly studied the alterations in the distribution and character of blood in shock and hemorrhage. They regard a high capillary red count as the first noteworthy characteristic, particularly noteworthy since hemorrhage so often complicates the war cases. A 7-per-cent solution of gum acacia in sodium chloride solution as advocated by Bayliss raised the blood-pressure in shock, but lowered both the blood count and the hemoglobin, as might be expected. Hypertonic saline injections distinctly rapidly lowered the high count of the capillary blood. Coincident with this there was a drop in the hemoglobin. The authors regard the continued concentration of the peripheral blood as of evil prognostic note, as is also a continued dilution of the blood beyond the fourth or fifth day after injury.

Cannon contributes a valuable paper upon the occurrence of acidosis in shock, hemorrhage, and gas infection. All these cases have a diminished supply of available alkali in the blood; the lower the pressure the more marked the acidosis. The pulse is rapid, but does not vary with the degree of acidosis. The respiratory rate becomes more rapid as the acidosis increases, until shortly before death a true air-hunger may prevail. This acidosis is not due to lack of circulating carbohydrate. It should be noted that operation on men suffering from shock and acidosis results in serious and rapid sinking of arterial pressure when it is already low, and in marked and sudden decrease of the alkali reserve of the blood when that reserve likewise is already low. This change may not occur if nitrous-oxide-oxygen anesthesia, instead of ether, is employed, but that anesthetic affords no guarantee against the ominous decline.

Cannon states that shocked men suffering after operation from extreme acidosis with "air-hunger" can be quickly relieved of their distress by intravenous injection of solution of bicarbonate, and their blood-pressure restored to normal.

REPORTS ON THERAPEUTIC PROGRESS.

FOCAL INFECTION AND RHEUMATISM.

To the *Boston Medical and Surgical Journal* of January 17, 1918, PREBLE contributes a paper in which he emphasizes the point that the treatment of arthritis deformans varies with the condition of the patient. The first step is to find and remove the primary and all possible secondary foci of infection, and usually the surgeon must be called in. It must be remembered that every colony of the causative microörganism is a focus that may continue to furnish bacteria to the blood stream after the primary focus is removed. The colonies in the joint tissues may themselves be sufficiently vigorous to keep alive the infection after the surgical removal of the original source of infection. This accounts for many failures in treatment.

After the focal infection is removed, the task is but begun. Every possible means must be used to build up the resistance of the patient. Rest, fresh air and sunshine, tonics, baths, exercise, and diet must all be given careful attention.

Rest in bed is advisable if there is much active inflammation, until the excessive tenderness of joint tissues abates.

Plenty of sunshine and fresh air have the same beneficial effect in these cases as in other chronic diseases.

As regards drugs, salicylates relieve the pain, and iron and arsenic may be indicated as general tonics. The bitter tonics or hydrochloric acid in essence of pepsin may be used to stimulate the appetite.

The excretory functions of the skin should be stimulated by daily baths. Many of these patients are too debilitated to take cold baths, but tepid baths are just as beneficial.

As regards the diet, it should be remembered that the old "red meat" theory was exploded in 1902, but the idea is not yet completely eradicated. It was formerly assumed that uric acid and rheumatism were in some way related, and that the so-called red meats—beef, mutton, venison, etc.—contained more uric acid than the light-colored meats. Both assumptions were wrong. Arthritis deformans is an infectious disease, and the only respect in which food influences its course is in the way of general nutrition. As regards the "red meats," it was definitely proven over fifteen years ago that beef, mutton, etc., contain less than one-third as much of the purin bases (from which uric acid is formed) as chicken, veal, and lamb.

Patients with arthritis deformans need plenty of protein to help build up the wasted muscles and other tissues. Recent work by the biological chemists seems to show that all of the amino acids found in the various proteids are necessary constituents of the body, and it is probable that a considerable surplus of proteid, above the quantitative proteid requirement, is necessary in order to furnish a sufficient variety of amino acids to satisfy the wants of all body tissues. Meat, fish, milk, and eggs should be given freely, and the total proteid intake should approximate 100 grammes daily.

The carbohydrate intake should be regulated according to the general state of nutrition of the patient. The obese patient should have small quantities of bread and sweets, with an abundance of green vegetables and fruits. The poorly nourished patient should have plenty of bread, with butter, milk and cream added freely to the diet. All of these patients should have plenty of fruit and fruit juices, and fresh vegetables to supply the various salts necessary for the body chemistry.

It should be remembered that the old idea, that acid fruits and vegetables cause rheumatism or "make the blood acid," is erroneous. On the contrary, practically all of the organic acids in our common fruits and vegetables form alkaline carbonates when absorbed, and increase the alkali re-

serve of the blood. Prunes, plums, and cranberries are the exception. Oranges, grapefruit, tomatoes, etc., with a sufficient quantity of fodder vegetables to give the necessary bulk to the stools, are indicated.

The fats are used freely or sparingly according to the patient's store of body fat. Butter and cream are, as a rule, very easily handled by the digestive tract. It is never necessary to give olive oil or cod-liver oil, as butter and cream are no more expensive, are just as nourishing and much more palatable.

The fluid intake is important. Sufficient water and other liquids, such as tea, coffee, and milk, should be given to enable the kidneys to excrete with the least possible irritation not only the normal waste products of metabolism, but also the toxins released from the dead bodies of the bacteria, or formed by the bacterial metabolism. A minimum of two quarts daily should be given to an adult. Intelligent supervision of the diet is the most important single factor in building up the health of these patients.

The local treatment of the joints in the severer cases is a problem for the orthopedic surgeon. Every possible means should be used to restore the circulation in the anemic and under-nourished joint tissues. In the stage of active inflammation rest is essential, and bandages, splints, or plaster casts may be necessary. After the active inflammation has subsided, passive motion should be used, then active motion, and finally graduated exercise of the joint to break up adhesions and restore mobility. Massage is particularly beneficial. Alternating hot and cold shower baths improve the circulation, and electricity relieves the pain and may help the tissue metabolism. The Bier treatment may be used to induce a passive hyperemia of the joint. In some cases, surgery is indicated to reduce deformity caused by contractures and ankylosis.

Vaccines may be indicated to assist in the formation of specific antibodies. The autogenous vaccine should always be used. The use of stock vaccines is unscientific, and is quite as likely to do harm as good.

Sera have been tried without any beneficial result, and in some cases distressing anaphylactic symptoms result.

HEADACHE DUE TO NASAL DISEASE.

In the *Saint Paul Medical Journal* for December, 1917, PUTNAM claims that headache is the most common symptom of affections of the nose and its sinuses, and is of great value in arriving at a diagnosis. Many cases of nasal accessory sinus disease go through life with a diagnosis of chronic headache.

There are many varieties of nasal conditions causing headache:

1. Swelling of the mucosa with pressure on its nerves.
2. Contact of the swollen mucosa.
3. Stasis following obstruction of the drainage passages.
4. Negative pressure in the sinus.
5. Reabsorption of toxins formed within the sinus.
6. Ulceration of the mucosa involving the nerve supply.

Direct contact of the swollen mucosa, such as pressure upon the septum from turbinal hypertrophies, is a very common cause of headache. These cases are being repeatedly refracted without relief of the pain or examination of the nose.

Putnam's treatment consists of shrinking the nasal mucosa with tampons of ten-per-cent solution of argyrol. This often affords immediate relief from the headache accompanying acute sinusitis. It depletes the inflamed tissues, stimulates ciliary motion, thereby favoring drainage from the passages. The most frequent surgical treatment consists of correcting deflected septa. Operative work upon a diseased sinus is only occasionally required.

The amount of headache in a given case may have very little bearing upon the severity of the nasal lesion. Very severe pain

is often found with minor changes, or slight pain with severe cases.

To summarize: The percentage of headache caused by nasal disease is far greater than realized by the public or physicians in general. The headaches are varied both as to location and severity. Facial neuralgia is frequently due to sinus disease. Migraine is aggravated by nasal disease. Headache in the supraorbital region in chronic cases is more likely to be caused by pressure of a hypertrophied middle turbinate than by an inflammation of the frontal sinus. In chronic antrum inflammation there is a full, tense feeling over the affected cavity, with pain passing to the eye and sometimes ear of affected side. Headache in frontal sinusitis at the beginning is felt over the affected sinus. Later in chronic cases it is felt in the vertex, even occiput, and possibly the temples. In ethmoid diseases there is headache between the eyes. Many cases of headache due to sinus disease are referred for refraction. The public commonly associate headache with eye-strain, but seldom with nasal disease. Many of them have been repeatedly refracted without nasal origin considered, and yet nasal disease is responsible for the greatest number of headaches, neuralgias, and pains in the head.

ACUTE OTITIS MEDIA IN CHILDHOOD.

In the *Pennsylvania Medical Journal* for December, 1917, Wood points out the well-known fact that the most important symptom of inflammation of the middle ear is pain, and it is the one which usually calls our attention to the ear. This in babies or young children is manifested according to the severity of the pain by irritability or by intermittent or more or less continued crying. The carrying of the hand to the head is suggestive, but by no means pathognomonic. The pain in the early stages is usually periodic and worse at night. Because pain is one of our most important guides as to the progress of the disease, the use of morphine and like drugs should, as a rule, be avoided. Local remedies which relieve the pain by modifying the local condition should be used instead, and the best of these is the application of heat. This can be used either dry or moist. The hot-water bag or hot salt bag will frequently relieve pain and almost always alleviates it in the early stages. Moist heat can be best applied by douching the canal with hot water, the temperature varying from 105° to 115° F., according to the tolerance of the patient. Warmed carbolized glycerin, 5 to 10 per cent, may be instilled into the canal, but the use of oily solutions or other substances which are not aseptic or cannot be readily removed should be avoided because of the importance of keeping the canal sterile in case spontaneous rupture of the drum occurs or paracentesis becomes necessary. The nasal fossæ should be kept free and the turbinals contracted in order to promote drainage through the Eustachian tube. The application of cocaine, by the physician, carried along the floor of the nose to the region of the tubal opening, is not only permissible, but of distinct advantage.

If the pain persists after such treatment it is probable that paracentesis of the drum will be necessary. Wood believes strongly in early paracentesis if proper care can be given the patient after the drum is opened. When either spontaneous rupture has occurred or paracentesis has been done the middle ear is brought into communication with the canal and strict asepsis must be observed. Secondary infection not only increases the risk of serious mastoid trouble, but is probably the important factor in long-continued discharge. Wood's routine technique consists in the use of thin cotton or gauze wicks tipped with 10-per-cent carbolized glycerin carried well into the canal and removed as frequently as they are soiled. If the wicks cannot be replaced as often as necessary they interfere with the drainage and had better be discarded. If the discharge is tenacious and difficult to remove the cautious use of a sterile boric

douche is proper, but in the majority of cases it is well to avoid any manipulation which tends to carry infection toward the middle ear. As a rule, more satisfactory results will be obtained by letting good enough alone than by the display of too much energy on the part of the practitioner. The treatment of acute otitis then is to obtain the best possible drainage and practice strict asepsis to avoid secondary infection.

In regard to the mastoid operations, Wood is inclined toward conservatism. As a general rule, he waits until reasonably convinced that the ear will not otherwise recover without more or less permanent functional damage. The presence of external swelling and tenderness back of the ear and even edema of the posterior wall of the canal with a fair elevation of temperature are not to his mind positive indications for the mastoid operation. The chief indication for operation is a tendency of the disease to progress instead of recovering, and it is in this direction very largely that the general practitioner is of distinct aid to the specialist. It is important for the general practitioner to note when the postoral swelling first occurs, when the ear first begins to discharge, the progress of the temperature curve, and the amount of pain. In fact he should be able to furnish the specialist with a detailed history of the progress of the local disease.

After free drainage from the middle ear has been established by a thorough paracentesis of the drum, pain should disappear or gradually become less. The fever should show distinct evidence of lessening within twenty-four hours; there should be a decrease in the swelling, and the tenderness over the mastoid and the leucocyte count should distinctly improve. Often, however, for the first three or four days this improvement is only slight, but as long as there is a tendency to improvement operation on the mastoid should wait. Also, the mastoid symptoms may suddenly increase in severity when the drainage of the ear has been interfered with either as the result of an accumulation of tenacious or partly dried secretion in the canal, or from the complete or partial closure of the opening in the drum. Cleaning out of the canal and repeating the paracentesis generally relieves this type of mastoid flare-up. If the mastoid symptoms are not too severe the paracentesis may be repeated three or four times without recourse to the mastoid operation. There are certain conditions which of course would lead to immediate operation—for instance, an external subperiosteal abscess, extreme constitutional intoxication or evidence of intracranial involvement. When once convinced that the mastoid operation is necessary it should be done with the least possible loss of time.

HOOKWORM DISEASE.

Discussing this subject in the *Southern Medical Journal* for December, 1917, McCULLOCH says we may fairly state that this is one of the few diseases in which we fortunately have what may be called a specific treatment. Three drugs have this specific action—thymol, oil of chenopodium, and betanaphthol—and of these chenopodium is the most efficacious, thymol stands second, and betanaphthol third. Betanaphthol sometimes causes irritation of the kidneys, and even perhaps nephritis. Oil of chenopodium expels the roundworms as well as the hookworms, but requires prompt purgation; occasionally it is followed by unfavorable results and even by death. Thymol must be given under precautions as to diet, and even then it is followed by unfavorable poisonous symptoms and even death in some cases.

Much more experience with the treatment of hookworm disease has been had in Porto Rico than in any other place, and McCulloch describes Ashford's method of administering it. In the evening an ounce of a saline cathartic such as magnesium or sodium sulphate is given, and the patient is kept in bed and without food until the next

day at 10 o'clock P.M. Two grammes of powdered thymol (adult dose) in capsules are given at 8 o'clock in the morning, and the same dose is repeated at 10 o'clock. Stiles prefers to divide the thymol into three equal doses, administered at 6, 7, and 8, and followed by salts at 10 A.M. His argument is that he obtains the same amount of grain-hour action, but if the patient has an idiosyncrasy to thymol, the effects will be less on a one-third than on a half dose, and less on a two-thirds than on a three-thirds dose. If the second dose is well taken, the third dose rarely produces untoward effects. At noon a purgative dose of salts is administered. In the afternoon light diet is allowed, avoiding oils or fatty foods such as butter and milk. Solvents of the drug, such as alcohol and oils, are to be avoided during the treatment, as they are likely to lead to the absorption into the system of poisonous amounts of the drug. It will, McCulloch thinks, be of interest to note here that the standard medical text-books, as late as 1905, recommended the giving of thymol in brandy, and, following this, castor oil! This was the English routine in Egypt, which was copied into American text-books, prior to American experience with the disease. This mistake has been corrected in later editions, but it is consoling to know that even the leaders in the medical profession cannot know everything; for even Homer nods at times. We all make mistakes. The thing to do is to have them as few as possible and to profit by them when they do occur.

The course of treatment McCulloch has outlined is repeated each week until, on microscopic examination, the worms are found to be all expelled. Three or more courses of treatment may be necessary. No subsequent tonics are required, according to Ashford. The dose is graded according to the age and strength of the patient. Under five years about ½ gramme is the total dose; up to ten, about 1 gramme. In the aged and weak the ordinary adult dose should be reduced. A million or two doses of thymol have been given in Porto Rico without fatal result, but several deaths have occurred during treatment in the Southern States and elsewhere. The untoward effects which sometimes occur are depression and dizziness, with burning and irritation of the bowels. Delirium and collapse with dark urine may occur in severe cases of poisoning.

If betanaphthol is given, the dose is about one-half that of thymol. The ethereal extract of male-fern in doses of eight grammes has been used successfully in Porto Rico.

Castellani thinks that eucalyptol with chloroform is safer than thymol in the debilitated patient. The formula recommended is as follows:

> Olei eucalypti (seu eucalyptol), minims xxx;
> Chloroformis, minims xlv;
> Olei ricini, drachms x.
>
> One-half to be given the first thing in the morning, the other in half an hour, the administration to be preceded a few hours earlier by a saline purgative.

Ashford says that this treatment is dangerous and unjustifiable. When the doctors disagree, who shall decide? The practitioner, or rather the patient, can "pay his money and take his choice."

When thymol cannot be obtained, satisfactory treatment may be effected with oil of chenopodium, some authorities even preferring the latter drug. After an eight hours' fast, a dose of 16 drops of the oil is administered (to the adult), and at two-hour intervals thereafter two more such doses. Some physicians prefer to give this drug daily for three days, followed by four drugless days. Two hours after the last dose an ounce of castor oil with or without 50 drops of chloroform is given. It may be necessary to repeat the treatment a week later. The bad taste and unpleasant after-symptoms of dizziness may be obviated, it is said, by the use of strong extract of coffee. It is claimed that the oil of chenopodium is not toxic in therapeutic doses, but prompt purgation is necessary, and sev-

eral cases of severe and even fatal poisoning are known.

A three-per-cent solution of salicylic acid in alcohol is the best local application for the ground itch.

A CASE OF FATAL POISONING BY OIL OF CHENOPODIUM.

In the *China Medical Journal* for November, 1917, HIRST and MILLS report a death from chenopodium and then give these additional points of differentiation when the patient chances to be a pregnant woman as in this case:

DIFFERENTIAL DIAGNOSIS.

GENERAL FEATURES.

Eclampsia.	*Oil of Chenopodium Poisoning.*
Prodromal symptoms as headache, albuminuria, vomiting, disturbances of the special senses, edema, high pulse tension.	Absent, urine normal.
Temperature high.	Not elevated.
Pulmonary edema common.	Absent.
Condition of Liver.	
Hemorrhagic or anemic necroses common.	Generalized necrosis.
Thrombosis of portal veins.	None.
Fatty degeneration of periphery of lobules.	None.
General autolysis of liver occasionally.	Present.
Hepatitis and perihepatitis hemorrhagica occasionally.	None.
Condition of Kidney.	
Various forms of acute and chronic parenchymatous nephritis.	Acute degeneration, on evidence or preceding nephritic involvement.
Circulatory System.	
Ventricles full of slowly clotting blood.	Heart stopped in systole, ventricles contracted and almost empty.
Heart muscle fatty with small hemorrhages, necroses, and thrombi; friable.	Heart muscle normal.
Subpericardial hemorrhages, sometimes.	None.
Pulmonary congestion and edema common.	None.
Hemorrhages, common.	None.
Emboli, common.	None found.

In the absence of any published report on the typical findings in cases of oil of chenopodium poisoning, the coincidence of postpartum changes, the administration of chloroform anesthetic for Cæsarian section with the possibility of the occurrence of delayed chloroform poisoning, and the inability to absolutely exclude eclampsia, the decision as to what should be the exact title of this paper was made with some difficulty. The danger of a second dose of the oil given a short interval after the first was not drawn to the attention of the writers until a few months later, when Dr. Heiser mentioned somewhat similar cases having been seen in Samoa. The fact that the liver and kidneys were so completely degenerated in this fatal case, and that a second course of the oil is coming to be regarded as a risky procedure unless a sufficient interval has elapsed, lead to the justifiable suspicion that perhaps the first dose may do an unwarrantable amount of damage. It happens that a few accidents occur with most of our efficient remedies until the proper limitations have been fully determined, and it may be so in the present case. On the other hand, one accident should not lead to pessimism concerning the dangers attending the use of a remedy in a person in whom there is no reason to suspect an unusual strain upon, or antecedent disease of, the liver or kidneys.

In the general discussion following the reading of this article before the annual meeting of the Korea Medical Missionary Association there were several reports of untoward symptoms following the use of oil of chenopodium. Temporary deafness was noted in several cases, in a few of which only one course of the drug had been given. Practically all agreed as to the value of the remedy for the removal of the hookworm and roundworm simultaneously, and believed the risk incurred was not commensurate with the benefit to be derived. There is, however, an economic feature involved in that the cost of a dose of oil of chenopodium is now greater than that of either santonin or betanaphthol, but not greater than both combined. Hence from a financial standpoint there may be some question as to the advisability of using chenopodium when either the roundworm or the hookworm is the only parasite.

In spite of this unfortunate experience the drug has been frequently used by them since as an anthelmintic. The dose has been increased to three administrations of 1 Cc. each, at hourly intervals, and only one patient suffered inconvenience, which was in the form of temporary deafness. This

change has increased its efficiency, and in many cases a repetition of the treatment was not required. In the smaller dosage, as used in the fatal case reported, it removed roundworms and tapeworms, but left two hookworms even after the second course. The increase in the dosage has markedly raised the efficiency of the drug without a corresponding increase in the toxicity. This modification in the method of treatment is evidently a step in the right direction, as the lesson to be derived from this case is, at least, that one large dose is safer than two smaller ones. Furthermore, the need of tests by which to determine the functional capacity of the liver and its condition as the result of previous disease is more keenly felt.

SERUM DISEASE FOLLOWING INTRATHECAL INJECTIONS.

The *British Medical Journal* of December 8, 1917, records the fact that at a meeting of the Section of Medicine of the Royal Society of Medicine held on November 27, the vice-president, Surgeon-General H. D. Rolleston, R.N., who was in the chair, read a paper comparing the manifestations of serum disease after the intrathecal and after the hypodermic method of injection. Speaking of meningism due to serum disease, he said that injection of serum into a healthy intrathecal space set up an aseptic chemical meningitis, whereas injection of antimeningococcic serum in cerebrospinal fever reduced the inflammatory process, presumably by destroying the meningococci. It had been pointed out by Neal, Abramson, and others that injection of serum into slightly inflamed meninges set up in most cases an acute aseptic meningitis shown clinically by fever, rigidity of the neck, and other signs of meningeal irritation. It was desirable to have some means of determining whether there was a genuine relapse which would be benefited by serum, or whether the condition was one of meningeal irritation or meningism and a manifestation of serum disease which might be intensified by a further injection of serum. The diagnosis could be made by examination of the cerebrospinal fluid for the presence of meningococci, and also for the normal reducing agent (glucose), which is absent in relapses of meningitis and present in the meningism due to serum disease. This meningeal manifestation of serum disease was peculiar to intrathecal injections of serum. It did not appear to result from large quantities of serum given, nor could it be explained as due to an intrathecal injection within a very few days of the appearance of the serum rash, but was probably connected with some hypersensitiveness of the meninges. It did not appear to be proved that the incidence of serum disease was higher after intrathecal than after the hypodermic method of injection. Intrathecal injection of serum necessarily involved risk of inducing increased intracranial pressure and might introduce a secondary infection; but it was not proved that the volume of serum injection favored a secondary infection of the meninges from the blood stream.

Dr. Claude B. Ker gave an account of a series of 60 cases treated with Flexner's serum. Of 48 patients who lived nine days or over, 36, or 76 per cent, suffered from serum sickness. The outstanding feature was the rash; arthritis was noted in six cases only, and in these was very severe. Adenitis of the cervical glands was present in two cases. An interesting point was the occurrence in nine cases of prodromal fever for twelve or twenty-four hours before any other symptoms. More than a third of the total reactions commenced on the ninth day. In 19 cases the rash was troublesome for four days or over, and in three it lasted for fully eight days. It was now well understood that the introduction of horse serum into the spinal canal was liable to set up a local reaction, which might be described as an aseptic meningitis, so that the possibility of a fluid becoming more turbid from this cause must be remembered, and in the absence of germs it was probably wise not to take an increase of

turbidity too seriously. The great number of rashes might suggest that intrathecal injection was more liable to cause them than the subcutaneous method, but he did not believe that this was the case. It was not unusual to find that the use of certain consignments of horse serum was followed by the appearance of an unusually large number of rashes, and it was generally admitted that the blood of some horses was more irritating than that of others. He thought that this might be the explanation of the large number of reactions following the use of this particular serum of Flexner's. His record did not show that the occurrence of the rash was much influenced by the dosage. He thought these attacks of serum sickness were of advantage rather than otherwise, many cerebrospinal patients being much improved by these reactions. The benefit was probably due to some stimulation of metabolism and the processes of repair. The Fehling test was a useful means of determining whether a rise of temperature, with an exacerbation of meningeal symptoms, was caused by a reaction or by a recrudescence of the disease.

PRINCIPLES AND POSSIBILITIES IN THE DIETETIC TREATMENT OF DIABETES.

In the *Wisconsin Medical Journal* for December, 1917, ALLEN states that there are three sorts of difficulties that may be encountered in certain cases. They may be classified as coma, complications, and inanition. Coma, of course, is one of the commonest, and acidosis is the danger which most commonly clears up under fasting. Allen's treatment for impending coma is to place the patient immediately on an absolute fast. It is important to recognize which type of case it is, whether the patient will develop acidosis on fasting or whether the acidosis will clear up on fasting. To some extent Allen follows the empirical rule that if a patient has gone into coma on feeding we fast him, and if he has gone into coma on fasting we feed him—without always knowing why. It may be necessary to feed carbohydrates; perhaps protein is the most important food. Whichever plan of treatment is first tried, carbon dioxide estimations are made every few hours in a critical case, to determine whether the progress is good or bad and whether the treatment should be changed.

Alkali is at the present time a disputed matter. Allen generally uses a certain amount of alkali for coma cases. Dr. Joslin treats practically all of his patients without alkali. One thing is certain, that most cases very close to coma can be treated safely and successfully without any alkali at all. That is to say, they are forming their own alkali with their ammonia, they are neutralizing their acids; and alkali treatment generally offers nothing more than an additional boost. If the patient merely holds on a level for the first day or two, and does not grow worse, especially if the carbon dioxide in his breath or his blood holds even, or rises slightly, he will generally come through safely.

In most cases, in Allen's experience, small doses of alkali have seemed to bring up the alkalinity of the blood somewhat more rapidly and hasten the return of subjective comfort. But the importance of this movement of minimal use of alkali is to correct the wide-spread abuse of alkali. In coma it has been customary to pour tremendous amounts of alkali into a patient, sometimes as much as a liter of 4-per-cent sodium bicarbonate or carbonate intravenously at once. Some persons have done this, and have brought some patients through, and fatal results have always been blamed upon the diabetes. When such a dose as a liter of 4-per-cent bicarbonate solution is injected intravenously through a needle, in perhaps a half-hour or three-quarters of an hour the patient may show no change or may seem a little better in consciousness or otherwise at the end of it. But within an hour or a few hours later he may die very suddenly; and it is not certain that such a death is due wholly to diabetic coma. Edema and small hemor-

rhages of the meninges have been described as the cause of sudden death after large doses of alkali.

In some cases alkali given intravenously probably is beneficial. Allen almost always gives it by mouth; but where it cannot be taken or retained that way it may be given intravenously. Allen knows of one case in another person's experience in which small doses of 200 Cc. or 300 Cc. at a time of 4-per-cent bicarbonate, several hours apart, may have been life-saving. The patient recovered, when he might not otherwise have recovered. But to attempt to take a low alkalinity of the blood and suddenly force it up to normal or above normal by a huge sudden dose of alkali is a dangerous procedure, and is perhaps responsible for a number of deaths that are attributed to coma. Sometimes a patient will come out of coma if he is just given a fair chance by being let alone. That does not mean the majority. One rule in coma is not to act in a panic, but to give the patient a chance to do what he can, and simply help him as far as possible in the doing of it.

PAINLESS CHILDBIRTH BY MEANS OF HYOSCINE, SCOPOLAMINE, AND MORPHINE.

To the *British Medical Journal* of December 8, 1917, POTTS contributes a paper in which he admits that under this method the great bugbear is an asphyxiated or stillborn baby. He claims, however, that in the absence of an obstetric abnormality which would, with any treatment, have produced the condition, faulty technique is to blame. In his series of thirty private cases seven babies showed some degree of asphyxia; four of these occurred in the first seven; the three others presented only a mild degree (oligopnea), and two of these occurred with contracted pelves. In the first of the asphyxiated cases forceps were required; the next was a small child more than two months premature, while the mother of the third had had phthisis and a previous miscarriage, and in this pregnancy had suffered from severe tachycardia. In the series of thirty hospital cases there were six cases of asphyxia; three of them occurred in the first eight.

In addition to the thirteen cases of asphyxia in the whole sixty, four were stillborn; only one of these occurred in the private cases; as the fetus was macerated and only one dose had been given four hours before birth, the drugs were not to blame. The three others were hospital cases of contracted pelvis which ought to have been treated by induction or Cæsarian section, but only came into hospital after being examined outside and after being in labor for many hours. In one, forceps having been applied unsuccessfully both before and after admission to the hospital, version was performed, but the after-coming head had to be perforated. In the second, a primipara, the child was born after more than seventy hours of labor; only one dose was given, and this was not responsible for the delay, but the facts that the child weighed 8 pounds and the diagonal conjugate measured only 3¾ inches. The third was a breech case in a multipara; labor lasted for thirty-four hours, there being great delay in the extraction of the after-coming head. These facts, and the further fact that several cases had pelvic contraction, while one was a face case, one an occipito-posterior persistent lasting twenty-one hours and delivered by forceps, one a twin labor lasting sixty-three hours, both babies being born alive and not asphyxiated, one a rigid cervix treated by version forty hours after labor began, and another a rigid cervix treated by dilatation and the introduction of a Champetier de Ribes bag, labor lasting seventy-seven and a half hours, show that the fetal mortality is not increased. In two cases forceps had to be used owing to slowing of the fetal heart; both babies were saved.

Some patients had only one dose, but most a larger number; three had eight injections and one nine, the average number being 2.8 in hospital cases and 3.13 in private practice. Several patients slept continuously, others slept in the intervals, waking when pains occurred, but remembering

nothing afterwards. One patient said the baby was not hers, as hers was still unborn, the house-surgeon having given her an injection which had stopped everything! In the thirty hospital cases three had morbid temperatures, but two of these had been examined before admission. In the thirty private cases only one had a morbid temperature. Two patients, one in hospital and one in private, had some postpartum hemorrhage, for which the uterus was plugged. One hospital patient was peculiar for two days after treatment; her husband said she was of a very excitable nature. All the patients did well afterward, and all were able to go home in fourteen days. All the babies were satisfactory.

The drugs are powerful and treatment must not be lightly undertaken, but with experience, care, and close supervision the treatment does not involve any risk other than those inherent in labor itself. The relief of suffering is an enormous gain, but an even greater advantage is that, owing to the elimination of all nervous shock and exhaustion, patients are well when they wake, and present a marked contrast to those women who have gone through in the ordinary way. The close supervision and control of the patient in bed reduces the risk of infection, and enables all emergencies to be promptly dealt with. The diminished fetal mortality, and morbidity of the mother, shown in all statistics of cases treated on Gauss's lines, follow as a matter of course.

PERNICIOUS MALIGNANT TERTIAN MALARIA SUCCESSFULLY TREATED BY QUININE ACID HYDROBROMIDE INTRAVENOUSLY.

In the *Indian Medical Gazette* for November, 1917, ROGERS reminds us that quinine has for long been given intravenously in cases of pernicious malaria with cerebral symptoms, although often too late to save the patient. Many consider it dangerous, but Rogers has thought that the danger is mainly in delaying its use too long. He has recently investigated the toxicity of the more soluble salts of quinine and cinchonine intravenously and has come to the conclusion that the bihydrochloride and the acid hydrobomide of quinine are the best salts to use. The latter is much the least toxic and causes less giddiness, but it must be remembered that it contains only three-fourths as much of the alkaloid as the bihydrochloride. Shortly after Rogers had reached this conclusion, and found that 10-grain doses of the acid hydrobromide intravenously are well borne and that 15-grain doses can be given, the following case came under his care which enabled the intravenous use of the drug to be submitted to a most exacting test.

A Hindu male, aged thirty-two, was admitted to the isolation ward as a cholera case in a collapsed and semiconscious condition. The specific gravity of the blood was only 1048, which practically excluded cholera. The axillary temperature was 99.6° and the rectal temperature 105.4°, so the blood was examined by Rogers's house-physician and extremely numerous malignant tertian parasites found. Rogers was informed of these observations, and ordered one gramme of acid hydrobromide of quinine in 10 Cc. of water to be injected intravenously, which was done at 4.30 P.M. The following morning his pulse had returned and he was conscious and could talk. The gramme dose was repeated morning and evening on this day as very numerous parasites were again found in the morning. On the second morning no parasites could be found, but three half-gramme doses of the acid hydrobromide were given that day and two half-gramme doses the following day, all intravenously. The temperature became normal seventy-two hours after admission, and except for a rise three days afterward, due to a mild attack of appendicitis, he had no more fever. On the eighth and ninth days 15-grain doses of bihydrochloride of quinine were given morning and evening by the rectum (analyses of the urine being done to estimate the excretion of the quinine), but no other quinine was given. The blood was examined daily for

the two weeks he remained in hospital, which he left at his own request, but no parasites were found after the first two days. He became extremely jaundiced, and the urine was nearly black with bile pigment and also contained some hemoglobin. Four days after admission his blood count showed red corpuscles 1,815,000, white 15,750, and the hemoglobin was 18 per cent. In order to watch the effect of the intravenous injections of quinine on the parasites, counts were made of the number of malignant tertian rings in proportion to 100 red corpuscles, several hundred being counted. The results are shown in the following table and will serve to illustrate the extreme intensity of the infection:

Table of the Number of M. T. Parasites per 100 Red Corpuscles.

Days on admission.	Number of M. T. parasites per 100 corpuscles.
1st ..... 3 P.M.	46
1st ..... 7 P.M.	39
2d .....10 A.M.	19
2d ..... 7 P.M.	10
3d and the following days.	*nil.*

Thus, allowing for a few of the red corpuscles having two parasites, 40 per cent of his red corpuscles must have been destroyed the first day and nearly 19 per cent the next day, showing an extremely intense infection. The collapsed and semiconscious condition on admission indicated a very toxic condition. Yet the first intravenous dose of the acid hydrobromide of quinine completely altered for the better the condition of the patient, and in two days all the parasites had disappeared from the blood.

Several years ago Rogers met with two cases in which the number of parasites were about one-tenth as numerous as in this case, showing about five in every field of the microscope, and Rogers advised quinine intravenously on account of the severity of the infection. The medical man in charge of the patients would not allow an intravenous injection to be given, believing it to be dangerous, and in spite of fifty grains of quinine a day by the mouth one became comatose the following day and the other after three days, and both died. Yet the present patient, with several times as severe an infection and already showing extreme toxic symptoms, was saved by intravenous quinine, although Rogers feels certain nothing else could have saved him. Such facts speak for themselves regarding the very much greater efficiency of the intravenous method in severe infections of malaria.

OBSERVATIONS ON PAINLESS CHILDBIRTH.

Writing in the *British Medical Journal* of December 8, 1917, VIVIAN reminds us that when the scopolamine-morphine method first came into prominence in England we were told that, in order to insure success, it was essential for the practitioner to remain in attendance throughout the labor. Careful observation was said to be necessary to determine the dosage, and numerous elaborate tests were given for ascertaining whether the patients were in the required state of seminarcosis. If it were true that the practitioner could not safely leave the bedside, this fact would in itself constitute an insuperable objection to the employment of the method in a very large number of cases. There are very few practitioners, especially in war-time, who could devote so much time to each maternity case, and, even if they could do so, the fee would necessarily be prohibitive in the great majority of cases. Moreover, a method that demands such close observation suggests an undesirable element of danger.

In Vivian's first cases she strictly obeyed this rule, never leaving the bedside after the administration of the first injection. By keeping a careful record of the dosage, she soon came to the conclusion, however, that as good results could be obtained by adhering to a fixed dose, which need be varied only under abnormal conditions such as individual idiosyncrasy, or unduly prolonged labor due to uterine inertia, or any other cause.

Vivian's experience has taught her that the best results are obtained by means of a large initial dose administered as soon as the pains are strong and regular, followed by a small dose at intervals of two hours.

One must use one's judgment as to the right moment for beginning the treatment, the size of the os not being a reliable criterion.

Vivian's first injection consists of omnopon 2/3 grain, with scopolamine 1/100 grain, and within ten minutes of its administration the patient is almost invariably sound asleep, her mind remaining a blank until the confinement is over. The exceptions, which in her experience amount to about 6 per cent of the cases, are those women who, probably owing to some personal idiosyncrasy, are apparently not susceptible to the drug. Though their faces are flushed and their pupils enlarged, they remain wide-awake, and will subsequently state that they felt the pains with undiminished severity.

The second and subsequent injections consist of scopolamine 1/200 grain, administered at two-hourly intervals, provided the pains continue to be strong and regular. If the pains cease, the injections are suspended until the pains resume their proper course. In primiparæ, if the os is dilating very slowly and the pains occur only at long intervals, say every half or three-quarters of an hour, the scopolamine injections should be given every three or four hours only. In many cases Vivian has given ten injections in all. In one case she gave fifteen, and in another sixteen, without any injurious results either to the mother or baby. The largest total amount of scopolamine was one-tenth of a grain, and the baby was not even sleepy when it came into the world.

It is, of course, undeniable that some babies are affected by the drug, and a few of them have caused Vivian some anxiety, owing to their "blueness" and reluctance to breathe. In no single case, however, has a baby failed to respond to artificial respiration, hot and cold baths, etc., and she is of the opinion that this condition of oligopnea, though alarming to the uninitiated, is not really dangerous. She has entirely failed to find any connection between oligopnea in the infant and the amount of the drug administered to the mother; the worst cases occurred when only four or five injections had been given, while in the prolonged cases Vivian mentions, in which fifteen and sixteen injections were given, the infants showed no signs of poisoning. It has been stated that if the opium or morphine is repeated after the first injection, the baby will be born "blue," and this would no doubt be the case if opium were given with each injection. In some prolonged cases, when a patient has become very restless, Vivian has, however, added morphine ¼ grain to one of the intermediate injections without in any way adversely affecting the baby.

By adopting the above-mentioned routine for the injections, the latter can safely be left to a trained nurse in an ordinary straightforward case, and the doctor, having given the first injection, will not be required until the head is showing. The confinement need not, therefore, occupy any more of the doctor's time than an ordinary case, and one of the chief objections to the method thus falls to the ground.

[We would remind our readers that the preponderance of professional opinion in this country is opposed to this method.—Ed.]

TREATMENT OF TUBERCULOSIS.

Swan in *Northwest Medicine* for December, 1917, in discussing this problem says nothing about the use of drugs because there are none which have any specific effect on the disease. Any medicine or other procedure which will help remove complicating or concomitant difficulties should be employed, but they often add a burden to the digestive and eliminative functions which should be avoided.

Tuberculin has its warm advocates. It is an aid in some selected cases, but Swan does not think it should be used when there is much active trouble and should be given in minute doses, increased very slowly and under competent observation.

The treatment of special symptoms is often of great importance. Swan speaks only of cough. It is necessary that expectoration shall be free, and some cough is necessary to accomplish it. But excessive

and unproductive cough should be relieved, because it is exhausting to the patient and adds an element of trauma and irritation to organs which should be kept at rest. Most of such coughing is unnecessary. It may become a habit. Often it is caused by irritation in the upper respiratory passages, and coughing in turn increases the irritation, thus making a vicious circle. The irritation is analogous to itching of the skin, and the cough to scratching; and, to continue the simile, the more one scratches the worse the itching becomes. Some wise person has said "the best way to cure a cough is to stop coughing."

Whatever needs to be done to insure normal nose breathing or to eliminate sources of local irritation in the throat and upper air-passages should be done. Breathing through the nose or through a dry, crusty nose undoubtedly increases a tendency to cough, because the inspired air is insufficiently warmed and moistened.

Considerable benefit has been obtained by teaching patients to cough at the end of expiration instead of at the end of deep inspiration, as one naturally does. This lessens irritation from "scratching" and also shakes up the lung less. Expectoration is not interfered with by the procedure. When cough is severe, it should be temporarily controlled by sedatives till more curative measures can give relief.

PYELITIS IN INFANCY.

Writing in the *Pennsylvania Medical Journal* for December, 1917, REWALT states that prophylactic treatment should be carried out by giving strict injunctions to the child's attendant, especially if the child be a girl. The mother or nurse should be instructed to cleanse the child by sponging it from the front backward and not in the opposite direction. By doing this fecal matter will be kept away from the vagina and urethra.

The dietetic treatment of pyelitis is of paramount importance. Sufferers from this disease must be fed or they will die from inanition and exhaustion. Breast milk is an ideal food, but should be given diluted with water. In the better-fed, the aversion to food is sometimes so great that gavage must be employed. Large quantities of water are absolutely essential. Enteroclysis in infants and children is most unsatisfactory. Therefore, if water is refused by mouth, it should be given by the stomach tube or even hypodermoclysis. Malt soup has been recommended on account of its alkaline reaction. Rewalt has had no experience with this food in the treatment of pyelitis.

Urotropin has been the most generally used drug in this condition and is excellent in acute cases. Given in doses from one to five grains, depending upon the age of the child, four to five times daily with copious draughts of water, it will usually give good results. However, it is most essential carefully to watch the urine for signs of renal irritation and stop the drug immediately in the presence of blood in the urine. Obviously, urotropin should not be used in the treatment of pyelonephritis.

Salol is a useful urinary antiseptic and may be used in the same doses as urotropin, either alone or in combination with that drug.

The alkaline treatment, while much safer, is not quite so efficient. This consists of the administration of sodium bicarbonate (dose 10-30 grains) with potassium citrate (dose 5-10 grains) given every two or three hours until the urine becomes definitely alkaline. When this happens, the doses are gradually diminished and continued for an indefinite period.

Some observers advocate the alternating of these two treatments, *i.e.*, using urotropin with or without the addition of an acid, in large doses for a week, and the next week giving the alkaline treatment. Rewalt employed this method in several cases and found it most beneficial.

Pelvic lavage is not practical in infants and young children. Neither have the results of bladder irrigation been encouraging. In fact, where involvement of the renal pelvis exists, either with or without cystitis, irrigation of the bladder is irrational.

ARTIFICIAL PNEUMOTHORAX.

In the *Boston Medical and Surgical Journal* of January 17, 1918, GAMMONS reaches these conclusions in a paper on this subject:

1. Hemorrhages can be treated by lung compression with best results if not continued after bleeding is controlled, in bilateral cases.

2. The opposite lung must be carefully watched, while in addition, as stated by Hawes of Boston, the patient should be under the closest supervision, preferably in a sanatorium.

3. Ulcerative cases promise the best results, and if a patient is doing well, inflation should not be undertaken.

4. The best results follow the frequent inflations with small amounts of air in cases in which the opposite lung is well or has an apparently healed lesion.

TREATMENT OF LEUKEMIA.

In an editorial article the *Boston Medical and Surgical Journal* of January 17, 1918, points out that although the exact provocative agent or condition in leukemia is as yet unknown, it is understood that the disease is due to some pathological disturbance in the blood-forming system which causes numerous mature and immature leucocytes to enter the blood stream. The blood-picture caused thereby is both interesting and familiar to nearly every observer. The change in the blood-picture is, of course, both as to quality and quantity, both having almost the same importance, but differing somewhat according as one blood-forming tissue or another is affected.

The treatment of this disease has thus far been very unsatisfactory. The particular type of leukemia found in any case is governed by hyperplastic changes in the splenomyelogenous or lymphatic tissues, as the case may be. The aim of treatment would seem to be a destruction of these hyperplastic elements and a regeneration of the blood-forming elements so that they would produce only stable and resistant cells. While hypoplasia can readily be produced by some form of therapeusis, unless the blood-forming elements are themselves regenerated there is recurrence, and often with markedly increased severity; and it is toward this latter aim that more certain therapeutic measures must be found. It had long been observed that after acute infectious diseases arising in leukemic individuals there occurred marked remissions in this disease, probably because of the destructive effect on the cells by the infective organisms or the inhibitory effect of the toxin on the blood-forming system. Arsenic, likewise, has caused much improvement in the disease, but only of a temporary character. Tolerance to the drug or the fact that arsenic is not definitely and selectively destructive to these tissues may account for the absence of any lasting value.

The first great step in the treatment of this disease was made, however, by the Roentgen rays. It seems that the effect of these rays is to cause a most rapid degeneration of the cells, so that they die in a very short time, or they may even be killed outright on the application of the rays. But after the prolonged application of the Roentgen rays to the blood-forming tissues, the spleen, bone-marrow, or lymphatic glands, there occurs a readjustment to this destructive effect of the rays, and although the young and the parent cells are diminished, their production is not checked altogether, but the cells produced are more resistant types. The progress of the leukemia is slowed, but not destroyed. On the other hand, this slowing may even be followed later by a greatly increased activity in cell production and a severe relapse.

But the observation of von Koranyi on the effect of benzol poisoning in girls employed in the factories utilizing this chemical gives hope that at last a more certain form of treatment has been found. Von Koranyi found that the drug first stimulated the marrow to leucocytic action, but that later there occurred a distinct hypoplasia. If employed to excess, the aplastic anemia can be fatal. In the treatment of this disease with benzol, symptoms of poisoning must be carefully watched, and when

there are headache, anemia, bladder and kidney irritation the drug must be discontinued for a long time, because its action lasts a long time after discontinuance. The reduction of the white blood cells to below 20,000 must be the lowest limit of therapeutic application. It seems that while the action of benzol is much slower than the Roentgen rays, its effect is more lasting and more certain, especially in the chronic stages of the disease. The best results will probably be obtained by the use of both therapeutic measures, benzol and the Roentgen rays, but the effect must be carefully watched. It is essential that blood examinations be freely made, so that treatment is not continued beyond a safe reduction of the cell count. Yet, in spite of the good results with benzol reported by some observers, it is too early to say whether results will be lasting or whether a specific has been unearthed for the treatment of this serious malady.

THE SURGICAL COMPLICATIONS OF ENTERIC FEVER.

The *Lancet* of December 1, 1917, after remarking that the manifestations of enteric fever are for the most part of medical interest, and that it is comparatively rarely that the surgeon is called upon to intervene in the treatment, points out that in every large epidemic there are some cases requiring surgical treatment, and the lecture by Lieutenant-Colonel Webb-Johnson, reported in the *Lancet* of the same date, gives a lucid account of these surgical complications. The discovery within recent years that enteric, which was only separated from other continued fevers after many years of careful observation, was not one disease, but rather a collection of three diseases resulting from the activities of a group of closely allied organisms, is, of course, of much more medical than surgical importance, but even in connection with surgery it is not without significance. With regard to the general severity and mortality we have learned that the differentiation of the diseases of the enteric group has shown that the paratyphoid forms are of decidedly less severity than the true typhoid form, and it may also be said with certainty that, so far as the surgeon is concerned, there is much less frequency of the need for surgical treatment in paratyphoid than in typhoid itself.

Perforation of the bowel is probably the most important surgical complication, and statistics show that it occurs with decidedly less frequency in the paratyphoid group. Equally remarkable is the influence of inoculation. In those who have not been inoculated perforation occurs with more than six times the frequency which we expect to meet with among the inoculated. Here there is a curious point: in paratyphoid the ulceration tends to involve the large intestine to a much greater extent than in the other form, and that will doubtless account for the fact that in paratyphoid a large percentage of the perforations occur in the large intestine. It is no easy matter to detect perforation; it occurs most commonly during the period when generally the patient is in a semiconscious condition, so that signs of pain may be entirely absent, and the only indication may be sudden collapse. As to the treatment of perforation there cannot be two opinions. Although the patient is probably not in a condition to invite operation, yet there can be no doubt that to open the abdomen immediately is the only possible course. It is true that patients have survived undoubted perforation without an operation, but the probability of this occurrence in any individual case is extremely small. Still, now and then restrictive peritoneal adhesions may form and wall off the perforated bowel. Unfortunately, the statistics of operation for intestinal perforation are not good, but many cases have been saved, and the hope of the future lies in earlier diagnosis, followed by immediate operation.

There is undoubtedly a great risk that the typhoid group of bacilli may attack the liver or the bile-ducts, and as in the enteric fevers the liver has to strain the blood of the portal vein and to separate from it the infective microörganisms, it is not strange

that these germs in their course along the bile-ducts should sometimes attack the walls of the channel, and so give rise to one form or other of inflammation. Cholecystitis is the most important of these, and the skill of the surgeon may be invoked to deal with it. The formation of gall-stones has always been somewhat of a mystery, but there is much evidence that microörganisms have a share in their production, and we may regard it as proved that the typhoid bacilli are in no little degree responsible for the formation of many biliary calculi.

That thrombosis may occur in typhoid is well known, and citrates have often been given internally for its treatment, but Colonel Webb-Johnson tells us that Captain H. F. Marris has had wonderful results with the intravenous injection of a weak solution of sodium citrate in normal saline.

Bacilluria is common in this group of diseases, and therefore it is not strange that affections of the genito-urinary tract are sometimes seen in the course of typhoid and its allies; and, further, Colonel Webb-Johnson, suggesting that the bacilli may be responsible for some of the cases of urinary stone, urges that urinary calculi should always be examined bacteriologically. The affection of one or both parotid glands is, without doubt, due to the passage of the typhoid organisms through the duct of Stenson; the condition is severe, but as it occurs mainly in those who are in a very low condition it is rather as an indication of the general weakness of the patient that the affection specially deserves notice. The typhoid diseases of joints and of bones, and especially of the spine, are often of serious moment, and the prompt recognition of their nature is highly valuable for treatment. It will thus be evident that the surgical importance of complications in typhoid is great, and that the surgeon is able to give aid in directions that were quite undreamt of by the therapeutists of a few years ago. This is the sort of position that spells progress, which is always indicated when a pathological condition passes from a distinctly surgical or medical sphere into one for common consideration.

TREATMENT OF PEPTIC ULCER.

Writing in the *New York State Journal of Medicine* for December, 1917, KAST points out that first of all it is necessary to be clear as to which cases should be treated medically and which should not. Kast groups his patients as follows:

A. Surgical without delay are cases of

1. Perforated ulcers.

They should be operated upon as soon as possible. If a delay of more than forty-eight hours has occurred; if there is no general peritonitis, and the situation seems safe, it becomes a matter of choice. Surgical experience, as well as his own, would indicate that it is better then to wait with the operation until the perforation is well walled off.

2. Repeated serious hemorrhages, particularly with continuous occult bleeding in chronic or recurring ulcers.

B. Surgical as soon as feasible:

1. Chronic ulcers which had the chance of one or two systematic rigid medical treatments—by which we understand, aside from other factors, four weeks in bed, and at least two months longer on an appropriate planful dietetic course.

2. All indurated ulcers, particularly with pyloric stenosis, or ulcers with disturbing adhesions.

3. Penetrating ulcers and hour-glass contractions.

4. Cases of intractable continuous secretion.

5. All cases which offer suspicion of malignancy.

C. Border-line cases:

1. Cases in which a medical cure becomes doubtful because of difficulties in giving up the time for treatment in bed and inability to carry out the proper diet and rest afterwards.

2. Cases of peptic ulcer complicated by severe neurasthenia, particularly those which become dependent upon anodynes.

To claim all cases should be treated medically as long as possible is as extreme and foolish as to claim all cases should be operated upon as soon as the diagnosis is

made. The extremists do not help but retard the growing understanding between surgeons and medical men. It is not the question which is the cure-all, but to learn by conservative exchange of our experiences to select, as early as possible, the cases which should be surgical and those which should at least, for the time being, remain medical. But Kast must confess that to his judgment a great many medical men persist in wasting time and good chances for the patient with ill-conceived and haphazard plans of medical treatment. On the other hand, the poor results from bad medical treatment are not an argument for surgery but for better medical treatment.

THE ORIGIN OF THE EPIGASTRIC PAINS IN CASES OF GASTRIC AND DUODENAL ULCER.

In the *American Journal of Physiology* of December 1, 1917, CARLSON states that the evidence points to the fact that the pains of gastric and duodenal ulcer are contraction pains arising either in the stomach or in the pylorus and upper part of the duodenum. In the case of the stomach the contractions are usually not stronger than those of normal digestion peristalsis of the filled or the hunger tonus rhythm of the empty stomach. This points clearly to a condition of hyperexcitability of the gastric pain nerves in the ulcer patients experiencing the typical ulcer pains.

Since the ulcer pains are due to tension of excessive contractions or of normal contractions on hyperexcitable pain nerves, it is evident that pathological states other than ulcer, inducing such hyperexcitability or hypermotility, will cause symptoms of gastric ulcer pains practically identical with those of ulcers, as appears to be the case in many instances of appendicitis, cholecystitis, and achylia.

The contraction origin of the ulcer pains also serves to explain the frequent, if not usual, lack of parallelism between ulcer pains and gastric acidity. Within certain limits the motility of the stomach is independent of the chemical reaction of the stomach contents. The influence of the chemical reaction of the gastric content on the pylorus is more complicated, but high acidity will intensify and prolong the duodenal reflex contraction of the pylorus as well as induce strong contraction in the duodenum itself. Clinical hyperacidity may in that way indirectly aggravate the ulcer pains from the contraction of these parts of the alimentary canal, and any measure (protein food, water, or alkalies) that temporarily lowers gastric acidity will temporarily ease these pains, provided there is sufficient relaxation of pylorus to allow the weakened gastric content to reach the duodenum.

When the ulcer pains are due to the tonus and contractions of the body of the stomach, any measure which inhibits or decreases the gastric tonus (ingestion of food, water, alkalies, or acids, passing of the stomach tube, etc.) will temporarily ease the pains, irrespective of the chemical reaction of the stomach content.

While it is true that in the gastric ulcer patients, so far carefully studied by the balloon method, the stomach contractions causing the pains have not been stronger than those of healthy persons, there may be cases of ulcer pains actually due to excessive contractions, especially in the case of the pylorus. The continuous epigastric pain at times present in ulcer is probably due to persistent hypertonus of the stomach or the pylorus, and the more severe pains that cause the patient to double up are probably due to pyloric spasm.

The contraction origin of the ulcer pains also helps to account for the many cases of gastric ulcer not accompanied by pain. The variable factors are the gastric, pyloric and duodenal contractions, the proximity of the ulcer to the main branches of the vagi, the extent of inflammation and edema in the ulcer area, and the degree of inherent stability of the autonomic nervous system of the individual. It is obvious that further advance of our knowledge in this difficult field requires a combination of the balloon and the fluoroscope method of objective

registration parallel with careful introspection on the part of the intelligent patient.

These newer aspects of the ulcer pains also serve to emphasize the fact that elimination of the ulcer pains is no criterion of healing of the ulcer. This criterion satisfies only the ignorant patient and the careless clinician.

SERUM DISEASE AFTER INTRATHECAL INJECTIONS OF SERUM.

In the *Lancet* of December 1, 1917, ROLLESTON states that though the clinical aspect of serum disease is so familiar that some apology is necessary for raising the subject, a brief comparison between its manifestations after the intrathecal and after the more usual hypodermic method of serum injection is appropriate. It might naturally be anticipated that intrathecal injection would make a difference, inasmuch as any local reaction in the meninges comparable to the rash sometimes seen to start from the neighborhood of a hypodermic injection of serum might, from the proximity of the spinal cord and brain, cause special nervous symptoms. The following statements are based on analysis of the clinical notes of cases of cerebrospinal fever in the Royal Navy.

Meningism Due to Serum Diseases.—During the third year of the war out of 96 bacteriologically proved cases of cerebrospinal fever treated by serums and surviving for ten days or more, 58, or 60 per cent, had a serum reaction, as judged by the appearance of a rash. Among these 58 cases there were nine, or 15.5 per cent, in which the rash was preceded or accompanied by a more or less definite recrudescence of meningitic manifestations, thus, especially when preceding the rash, suggesting a relapse of the disease. These symptoms are relieved by lumbar puncture, and under the assumption that they point to a relapse a fresh injection of serum may be given, as was done in six out of the nine cases. The three cases not so injected recovered, and of the six cases injected intrathecally with serum five were probably made worse, four eventually proving fatal, though it is not suggested that death was thus induced.

The effect of intrathecal injection of serum presents some peculiar features. Whereas, as is well known, injection into a healthy intrathecal space sets up an aseptic chemical meningitis, injection of antimeningococcic serum in cerebrospinal fever—as is shown by the clearing of the cerebrospinal fluid—reduces the inflammatory process, presumably by destroying the meningococci. In discussing the injection in acute poliomyelitis, Neal, Abramson, and others point out that injection of serum into slightly inflamed meninges sets up in most cases an acute aseptic meningitis shown clinically by fever, rigidity of the neck, and other signs of meningeal irritation. It seems probable that at the time of the serotoxic meningeal reaction the meninges are slightly inflamed, and that, as this is not due to meningococci, a fresh injection of serum aggravates the symptoms and possibly does harm rather than good.

It is therefore desirable to have some means of determining whether there is a genuine relapse which will be benefited by serum or whether the condition is one of meningeal irritation or meningism and a manifestation of serum disease which may be intensified by a further injection of serum. This diagnosis can be made by examination of the cerebrospinal fluid for the presence of meningococci, and also for the normal reducing agent (glucose), which is absent in relapses of meningitis and present in the meningism due to serum disease (Reveillet, Nové-Josserand, and Langeron). This test, which takes a few minutes only, and so enables a decision to be made on the question whether to withhold or inject serum at once, has been employed by Staff-Surgeon L. Warren, R.N., and by Dr. C. Ker at the City Hospital, Edinburgh, where some naval ratings were treated.

This meningeal manifestation of serum disease is peculiar to intrathecal injection of serum, and though it occurs in a small proportion of cases should be more widely recognized in this country in view of the

war-time increase of cerebrospinal fever. It has not, however, passed unnoticed. Netter and Debré in 1911 gave a good account of it, and regarded it as a result of serotoxic edema of the meninges. It may also be added that, as the mucous membranes originally attacked by diphtheria are liable to swell at the time of the serum reaction, an analogous sequence may be suggested in the case of meningococcic infection of the meninges.

If the meningism is part of the serum disease to be expected after intrathecal injection, the question arises why it is not noted more often. It does not appear to result from large quantities of serum given, for out of the 9 of the 58 naval cases with a serum reaction, 8 had less than 100 Cc., and 4 of these 8 less than 50 Cc.; nor can it be explained as due to an intrathecal injection within a very few days of the appearance of the serum rash. That it is connected with some hypersensitiveness of the meninges is probable enough, but it is impossible to get beyond this vague statement.

EDEMA AS A DANGER-SIGNAL IN THE STARVATION TREATMENT OF DIABETES.

In the *Journal of the American Medical Association* of December 8, 1917, CROFTAN states that since the popularization of the starvation method in newspapers and magazins, diabetics who had been carried along comfortably and safely for years have been clamoring for starvation. When their regular physician would not adopt the treatment, pilgrimages were undertaken to institutions that featured this cure.

Croftan's personal experience teaches him that in mild cases and cases of medium severity this rigorous plan is quite superfluous, and in certain types of the disease more dangerous than the old-established methods. There is this advantage in the method, that the period of protein starvation that inaugurates every tolerance determination is materially shortened. This is not new, or altogether safe; it is advantageous chiefly from the economic standpoint by reducing the length of the hospital period.

As to tolerance, Croftan has never so far seen an increase of the tolerance for carbohydrates in these milder cases follow a starvation cure; in fact, as a rule, he has found the tolerance reduced.

Alarming degrees of excretion of acetone bodies are apt to supervene in this type during starvation, or to follow the resumption of carbohydrate feeding. True, under the management of an expert and in properly equipped hospitals, these symptoms can as a rule be controlled; but, uncontrolled, in cases handled by routine outside, they are liable to become dangerous.

In very severe cases of acute onset, and in fulminating diabetes in children and adolescents, the method is of use as an emergency measure, the sugar often disappearing with startling rapidity, as rapidly as it generally disappears under a properly conducted oatmeal treatment. Croftan regrets to report that he has not, however, witnessed more favorable permanent results after starvation than after oatmeal, and the treatment is decidedly more uncomfortable, both to the patient and to the physician.

In view of the fact that starvation is generally employed outside of institutions and under the management of general practitioners who have neither the time nor the facilities, nor possibly the technical training, to control by daily chemical tests the effect of this strenuous method on the general metabolism of the patients, any clinical sign that is easy of recognition should be of value, especially if it constitutes a warning signal of impending danger from continuation of the routine.

Such a sign is edema occurring in the course of a starvation treatment, a sign that Croftan has had occasion to observe frequently, that he has learned to regard with considerable trepidation, and that he does not find mentioned in the literature, the only reference to it that has come to his notice being a verbal acknowledgment of its occurrence by Woodyatt in the course of a discussion of starvation before the Chicago Society of Internal Medicine. Its

occurrence in the course of oatmeal cures is mentioned by von Noorden.

Edema usually occurs suddenly, and is associated with an increase of excretion of the acetone bodies, a reduction in urination, and either a cessation of the weight reduction or even an increase in the weight, despite the withholding of food. On the administration of even small amounts of carbohydrate the edema rapidly disappears, and diuresis is promptly increased, without, however, a degree of glycosuria corresponding to the increased urination.

In diabetics, generally, fed on carbohydrates up to or slightly below their tolerance —that is, in diabetics kept free from hyperglycemia and glycosuria—edema is very rare; in fact, diabetics suffering from complicating cardiac or renal lesions in which one would expect edema are generally conspicuously free from the latter.

In hunger, on the other hand, even in non-diabetic subjects, the urinary output is generally below normal in comparison to the liquid intake; hence starving patients not infrequently show no loss of weight for prolonged periods, and occasionally even gain weight. This, of course, can be due only to water retention, and is probably attributable to the retention of the water generated in starvation from the increased forced metabolism of the protein and fats, and from the liberation of water from the shrinking body tissues. No doubt the organism retains this water to maintain a degree of osmotic equilibrium.

Edema, or its concomitant phenomenon, gain of weight, despite complete withdrawal of food and reduction of liquids, is a starvation phenomenon indicating forced catabolism of body tissues beyond the limits of safety; a degree of tissue destruction that constitutes the main element of danger in the severe types of diabetics, that rarely occurs spontaneously in the milder types of the disorder, and that a rational therapeutist should attempt by all means to prevent and to counteract.

"Pancreatic rest," postulated by Allen, is certainly not favored under these conditions; for nothing presumably can impose a greater strain on the hypothetic internal function of the pancreas than the disassimilation of products derived from forced tissue catabolism.

Edema occurring in starvation cures is a sign, therefore, to resume feeding; it is a danger-signal that, if neglected, and especially if associated with nausea, severe headache, and tremors, in Croftan's experience, invariably either leads to most alarming coma or, if this is prevented by large doses of sodium bicarbonate, leaves the patient, as far as his tolerance is concerned, in much worse condition than before the starvation plan was inaugurated.

Edema during "starvation" can be prevented by the administration of pancreatized oatmeal-alcohol-glycerin clysmata; Croftan has found that they do not interfere with the rapid sugar reduction, that they prevent the enormous formation of acetone bodies and materially contribute to the comfort of the patient.

ARTIFICIAL PNEUMOTHORAX IN THE TREATMENT OF ADVANCED CASES OF PULMONARY TUBERCULOSIS.

SHIVELY in the *American Medicine* for November, 1917, says he has never been able to understand why some writers advise arbitrarily limiting the amount of gas to two, three, or four hundred cubic centimeters. If the patient takes the gas well, Shively can see no reason when we are trying to collapse the lung and secure functional inactivity of the part and approximation of the walls of a cavity, with the resulting advantages of diminution in cough and expectoration, why all of the gas that can be introduced without harm to the patient may not be given at the initial treatment. Observe the limitation, however, *without harm to the patient.* Dyspnea, rapid heart action or pain should cause the cessation of the flow of gas, irrespective of the amount introduced, which in all cases should depend upon the subjective symptoms and objective signs during the administration. The purpose, however, is to secure a collapse of the lung, and

when the patient takes the gas nicely, without untoward symptoms of any kind, Shively can see no reason why we should not promptly attain this result at the first treatment, if possible.

After the first few treatments the patient should have a period of rest in bed and careful observation, but after we have taken his measure and have learned how he reacts to the treatment after the novelty has worn away, in many cases the gas may be administered as a part of office treatment. The gas is usually absorbed more rapidly at first than after a number of injections have been made. It is unusual for seven or eight hundred cubic centimeters to last longer than ten or fourteen days after the first injection. The largest amount Shively has given is 1650 Cc. A number of gases have been employed in pneumothorax, it being, of course, simply the mechanical effect of the pressure that is desired. In practice it has been found that sterile nitrogen, on account of its being less rapidly absorbed than other gases experimented with, is the one to be usually preferred. It may be interesting in this connection to note that at the Loomis Sanatorium, and several other institutions in favorable climatic situations, atmospheric, filtered air has been used with success. The disadvantage is its more rapid absorption. In one case in which Shively used Sullivan county air at Loomis 1350 Cc., which had produced a very satisfactory collapse as demonstrated by the fluoroscope—the collapsed lung, with two large cavities, hanging like a rag in the pleural cavity—was completely absorbed in one week, necessitating another early treatment. This quantity of nitrogen would probably have remained, not greatly diminished, after two or even three weeks.

In the past three years Shively has employed the pneumothorax treatment in fifty cases, all of them in a far advanced stage of the disease, not more than ten of which were without cavities of considerable size. In twelve of these cases very good permanent results were obtained. In six the effects of the treatment might be considered somewhat spectacular. One patient, who received twenty injections, gained fifty-six pounds, lost her fever, cough, expectoration, and bacilli, and has been apparently well for a year and a half. Another has gained twenty-five and a half pounds in four months and was able to take long walks during the summer over mountain roads. Another patient who was a hospital case with fever, chills, and hemorrhages has become an ambulant case, has lost her bacilli, and has gained twenty pounds in weight. Two others have been able to resume their work. In two cases with laryngeal complications there has been a marked improvement in their throats as well as in their general condition. Twelve other cases have been treated with satisfactory effect, although the results have not been so marked as in the first group. In two of these cases pneumothorax was administered for severe and uncontrollable hemorrhage, with prompt arrest of the symptom.

In six cases the disease has been progressive, and there has been observed little permanent effect from the treatment. One of these cases, which did very well for a year or longer, has received forty injections. In the past eight months there has been an extension of disease in the other lung with formation of a small cavity in the apex. Another patient, who received twenty-seven injections, did very well for a time, but has lost fifteen and a half pounds in ten months and has discontinued treatment.

Eight cases have died, two after a single injection, in which the treatment was used as a last resort and was no possible factor in the fatal issue. One of these cases besides his tuberculosis had syphilis and Bright's disease; the other, ascites and edema of the limbs with symptoms of intestinal tuberculosis. Another of the cases which died and which made a notable improvement developed acute articular rheumatism with a purpuric eruption and died suddenly nine days after her third injection of 800 Cc., apparently from a rheumatic cardiac complication. A patient who

had gained twelve pounds in weight after four treatments and was up and about acting as a ward helper, failed rapidly and died after refusing to continue treatment. In another of the fatal cases with active and progressive disease complicated by tuberculous arthritis, the pneumothorax treatment was discontinued after a few injections.

The twelve remaining cases to be accounted for are equally divided between those in which repeated efforts were unsuccessful in effecting an entrance into the pleural cavity and cases which discontinued treatment after one or two injections and before any significant effect could be expected.

THE MEDICAL TREATMENT OF CHOLECYSTITIS AND CHOLANGITIS.

Boggess in the *American Medicine* for November, 1917, asserts that the management of simple cholangitis and cholecystitis is much alike. Predisposing factors to some extent can and should be obviated. The patient should live more in the open air, and have active exercise with the assistance of a medical gymnast; if necessary he should have the diet restricted so as to avoid superalimentation; alcohol must be shunned; the eating of meats and fats decidedly limited; the carbohydrates decreased; sugar and sweets eliminated. He should limit himself to a little bread, buttermilk, fresh fish, perfectly ripened fruits and very fresh vegetables, following in fact the dietary advised in functional incompetence of the liver. Women after childbirth should adopt measures to prevent the too frequently remaining lax abdomen by proper abdominal exercises and supporting bandages, and should discontinue the practice of wearing the lower garments supported from the waist. Constipation must be overcome, and the alimentary tract kept in the best possible condition. Alkaline and carbonated waters should be drunk freely and frequently. Tea, coffee and chocolate are best omitted, substituting therefor the teas from aromatic herbs, or hot lemonade.

By the Turkish bath or its substitute the skin with benefit may be kept active, and drainage of the bile passages may be favored by a course at one of the mineral spas. Waters may be selected which are useful in stimulating the unstriped muscle fibers of the biliary ducts, besides removing sources of irritation from the intestine. Some of these waters apparently have a specially favorable action upon the biliary apparatus. Such are several of the springs of Saratoga, those of Bedford, Las Vegas, various sulphur springs, and many others of this country; and abroad, the waters of Carlsbad, Homburg, Vichy, Contrexeville, and Harrogate are a few of a large list that might be recommended, besides some of our excellent local spas, such as Dawson, French Lick, etc., and complete rest in bed.

In inflammatory affections of the liver, especially in cholecystitis and cholangitis, Reichmann recommends giving methylene blue in 0.03- to 0.05-gramme doses three times daily. He considers that the drug passes quickly through the organ and has a destructive action upon bacteria. [We doubt it.—Ed.] In this connection, it should be noted that the intermittent and imperfect elimination of methylene blue in the urine is considered by some French observers as a sign of functional deficiency of the liver as it is known to be of the kidneys.

Hexamethylenamin (0.3 to 1 gm.—gr. v to gr. xv) is recommended in subacute cholecystitis, because of its antiseptic effect; for the same purpose a combination of sodium salicylate and sodium benzoate (of each 0.6 gm.—gr. x) may serve equally well, and as an intestinal antiseptic is to be preferred. When there is a complicating duodenitis, it is best to select bismuth salicylate. It should be given in a mixture, and acts best associated with an equal amount of salol (0.3 gm.—gr. v) in some pleasant suspension.

In a typical case of acute cholecystitis, with fever, vomiting, constipation, severe pain and tenderness in the region of the gall-bladder, the following measures are advised: Place the patient in a full tub bath, very hot; irrigate the colon with hot

normal saline solution; follow this by the internal administration of a mixture of aspirin (1 gm.—gr. xv), bismuth subcarbonate (1 gm.—gr. xv), cherry laurel water (4 Cc.—dr. j), added to a sufficient amount of water. Should this be vomited, and should the pain continue, give a hypodermic of codeine phosphate and apply over the hypochondrium a large hot compress, and frequently renew it. As soon as it may be tolerated, give a moderate dose of calomel, and follow this after a few hours with a full dose of magnesium sulphate, given as a saturated solution and ice cold. The bowel may be further emptied by using a large colonic irrigation. When the stomach is calmed sufficiently, administer aspirin or magnesium salicylate with bismuth repeatedly as may be required to relieve the pain and soothe the biliary passages.

In a certain proportion of cases the cholangitis or cholecystitis is very acute. It is accompanied by chills, high temperature, leucocytosis, and great distress, often by severe pain. If the process is limited to the gall-bladder, jaundice may be entirely absent. Under such circumstances the general treatment should include absolute rest, a hot bath followed by a light poultice, antipyretics, and saline purgatives. Of the antipyretic drugs, there is a choice, not always to be made without trial. Sodium salicylate, magnesium salicylate, aspirin in fifteen-grain doses, with sodium glycocholate five grains every four hours, antipyrin and lactophenin, compose a desirable list. Full doses are required, for their action is not merely to reduce the temperature; often they overcome the pain, besides favoring the escape of bile. In those cases in which the symptoms do not quickly abate, drainage of the gall-bladder is required to save life. Such emergencies arise in the cholecystitis of typhoid and other infections.

When cholecystitis has continued for a considerable time, whether or not accompanied by cholangitis, it is safe to infer that a gall-stone is present, and if the attack is not relieved by medical treatment, it is usually because the gall-bladder is seriously diseased, or else because the stone has been forced into and retained by the cystic or common duct.

For many years, recognizing the dangers of gall-bladder involvement in typhoid fever, and looking upon it as just as serious as the intestinal pathology, it has been the habit of Boggess during the entire course of typhoid fever to administer five grains of salol and ten grains of urotropin every four hours. In this way, in his private practice, he has not seen serious gall-bladder involvement, either during the course of the disease or afterward, excepting in one case in which the gall-bladder ruptured the first week after the patient was put to bed.

Boggess is frequently asked what he thinks of typhoid vaccines for their therapeutic effects, and his reply has lately been this: We recognize the fact of the absolute protective powers of prophylactic doses of typhoid vaccines; we recognize also that it is the infected typhoid gall-bladders that make our "typhoid carriers"; that the typhoid vaccines relieve these cases and render the carrier innocuous. He believes in every case of typhoid fever therapeutic doses of vaccines should be used, more for their effect upon the gall-bladder; and he is sure that in this contention he is correct, that in every case of cholecystitis, in which there is a typhoid history, the typhoid vaccines should be given. The typhoid infection may exist in the gall-bladder for a great length of time, as has been shown in a number of cases. Hunner records one case in which there was a typhoid cholecystitis eighteen years after the attack of typhoid fever. There are also authentic cases in which the typhoid organism has been found in cholecystitis without the patient ever having had typhoid fever. Blumenthal records a case in which he obtained pure cultures of typhoid bacilli from the gall-bladder in a patient who had never had typhoid fever herself, but who had nursed her husband and one brother during an attack of the disease six or eight years previously.

In the other most frequent type of infective cholecystitis and cholangitis, viz.,

that of either pure colon bacillus infection, or where the colon bacillus is found in conjunction with other bacteria, Boggess is also a firm believer in the early and even frequent administration of appropriate vaccines. He thinks that he has recently secured some wonderful results in these cases from the early administration of colon bacillus vaccines. We know the positive results of these vaccines in pyelitis and pyelocystitis, and from these we can now reasonably expect the same marked and positive results in such infections of the gall-bladder. So, also, in infections from pneumonia and influenza, suitable vaccines may be given with just as much expectancy of positive results as in other cases.

Cholangitis and cholecystitis are always medical cases in their incipiency, and for a reasonable length of time, excepting under emergency conditions, as previously stated.

The remedies to be used in these cases are sodium glycocholate grains v, salol grains v, sodium benzoate grains x, urotropin, or better, its citrate, helmitol, in ten-grain doses; aspirin grain xv (where pain is present), the other salicylates, alkaline waters, limited and restricted diet, rest in bed, and the administration of suitable and appropriate vaccines.

OBSTETRIC FADS AND HERESIES.

In the *Medical Record* of December 8, 1917, GRANDIN writes on this topic in an entertaining way. The first fad he notes is the so-called "twilight sleep." Emanating from that land of myth and fiction along the shores of the vine-clad Rhine, it was introduced into America properly labeled, like other German patent medicines and tinware and matches. The American indorsers chose a popular magazine for advertising purposes, and women cried for it and professors boosted it! Like the moth, the Lord be praised, it has died the death to which, for the nonce, all things Hun are doomed, and to-day Grandin cannot find a single practitioner of repute who uses the method. Why it ever gained foothold passes his comprehension, unless the profession, sated with old-time methods of repute for allaying the anguish of child-bearing, is, like the Greek, hunting for a new god. Buckingham and Reynolds and their pupil Richardson taught Grandin a better method, and a method which does not carry a mortality-rate, nor an infantile death-rate, such as, on investigation, will be found associated with twilight sleep. In the fourth edition of his "Practical Obstetrics" Grandin analyzed the statistical data culled from German sources, and he showed that these data damned the method. Grandin says: Avoid, medical brethren, the folly of extremes, and hold fast to that which is good. Use chloral freely, and be not afraid; resort to morphine and atropine with judgment; administer quinine judiciously after the contractions are well under way; be not afraid of chloroform; do not delay the application of the low forceps after a timely fashion. Thus you render labor as nearly painless as our present knowledge permits, without subjecting woman or child to the dangers inevitably associated with the use of morphine, hyoscine, or scopolamine.

The next fad Grandin notes is the Cæsarian-section craze. It was his fortune to perform the early Cæsarian sections from an *elective* standpoint; that is to say, under the elective indications, in 1889-1890. His thesis for membership in the American Gynecological Society bore the title "A Plea for the Cæsarian Section from an *Elective* Standpoint." After the lapse of twenty years, with the experience thus gained, he can preach the same sermon to-day. *Festina lente*, obstetric friends! he exclaims. To show the extremes to which certain rabid Cæsarian sectionists will go: A number of years since an assistant of Grandin called on him, greatly perturbed because a professor had advised the section on his wife for the reason that in the previous labor she had suffered from uterine inertia! The pelvis was normal, the presentation L. O. A. Grandin quieted his young friend, ordered strychnine, gr. 1/40 t. i. d. for six weeks precedent to labor; when the contractions became active, chloral in 15-grain doses

every three-quarters of an hour until 60 grains had been administered; quinine, 15 grains at one dose. In fourteen hours the woman delivered herself of a splendid boy weighing 13 pounds. The woman has no scar on her belly; she did not run the modest 4-per-cent risk associated with the Cæsarian section; the professor was unable to notch his Cæsarian-section rod. Grandin has carefully analyzed the series of sections recorded by a number of operators, and it's "dollars to doughnuts" that Tarnier or Isaac E. Taylor, if alive, could cut the series at least 30 per cent. Grandin wonders if some of these operators are trained in the technique of version, if they own the axis-traction forceps, if they have relegated the induction of premature labor to the ash heap!

Another fad is this question of birth control. This question need never have arisen. In his professional career Grandin has never hesitated, after due consultation, to induce abortion where otherwise the life of the woman was imperiled. This course he will continue to follow. So far, he has escaped Sing Sing, although possibly, according to a certain religious belief, he may spend a few years in purgatory. If so, he will certainly find very congenial company. The daily press—sometimes to the exclusion of war news—has exploited this advance guard of woman suffrage. To the medical press Grandin would say that neither man nor woman should be entitled to procreate more children than they can rear. The doctrine he preaches is not that of birth control, but that of *sex repression*. Neither man nor woman should be allowed to make animals of themselves, and Grandin apologizes to the animals in remembrance of the fact that they are continent except during the rutting season. Followed to its logical limit, "birth control" allows men and women to copulate without sanction of law or clergy. The woman will "sin" all the more frequently because of lack of fear of the consequences. The man will remain the same rascal he has been, sexually, since in the garden of Eden Adam laid the blame on Eve.

POSTPARTUM HEMORRHAGE.

THOMAS in the *New York Medical Journal* of December 8, 1917, points out that the curative or active treatment of postpartum hemorrhage depends primarily upon the cause of the bleeding. If the lower parturient canal is lacerated and the fundus well contracted, as a rule serious bleeding will come from the cervix. This must be exposed by means of a volsella or stitch and any laceration present closed by means of chromicized catgut. The great majority of postpartum hemorrhages, however, have their origin in the uterine cavity, and here we have four general methods of procedure:

1. We may maintain uterine contractions by means of manual pressure or manipulation. The fundus uteri is grasped through the abdominal wall and manipulated by kneading until it contracts well and the contents are expelled. When this has occurred the hand should be held in a position of continuous pressure upon the fundus, ceasing any vigorous manipulation until the fundus relaxes and begins to rise, when it may be stimulated to contraction by kneading as before.

2. We have the use of drugs. The prompt and satisfactory results obtained from 1 Cc. of pituitrin administered by hypodermic intramuscularly cannot be overlooked. At the onset of any serious hemorrhage, accompanied by a flabby, poorly contracted uterus, pituitrin should be used immediately. The action is as a rule almost immediate, and although this action may be somewhat transient, still it will hold the uterus until some more lasting drug may assert itself. Bearing this in mind it is well to administer 1 or 2 Cc. of ergot hypodermically in the same way immediately after the pituitrin. Pituitrin we may consider solely as an emergency drug, and it does not in any way compete with the ergot preparations. On account of its rapid action it is indispensable.

3. The third method of combating hemorrhage is by means of the intrauterine douche. For this purpose a sterile douche

bag, tube, and nozzle—plain glass is preferable—should be carried in the outfit. The douche is of normal saline 110° to 120° F. carefully given, high in the uterine cavity. Boiled water or a two-per-cent acetic acid solution may be also used for this purpose. The main point is to give the douche quickly and give it hot.

4. The fourth method is the intrauterine gauze pack. For this purpose plain sterile gauze may be used as the action is wholly mechanical. It is best carried in the outfit in large glass tubes in the form of a somewhat thick strip. A good emergency package may be obtained with a two- to four-inch sterile gauze bandage. The administration of the pack is accomplished with the patient in the lithotomy position, perineum retracted, cervix brought down by volsella and packing introduced by long dressing forceps or looped sponge holder. The one point to remember in packing the uterus is that there should be no space in the upper part of the uterine cavity after the packing is inserted. The pressure of the gauze pack against the wall of the uterus maintains the contraction and thus stops hemorrhage. Therefore the packing must be firmly and thoroughly done. To insure this, one hand may be placed upon a sterile covering over the fundus during the process.

In case the packing does not control hemorrhage from the uterine cavity we may feel quite certain that the packing has not been carried high enough. The packing had better be removed, a hot intrauterine douche given, and repacking done with new gauze. The supportive methods in the treatment of postpartum hemorrhage are the same as for hemorrhage in other locations. Saline should be administered by intravenous infusion or by hypodermoclysis in the severe grades, and water by mouth and saline per rectum in the lesser grades. Morphine is given for its quieting effect, the foot of the bed is raised, external heat is applied, etc.

To summarize briefly: Any bleeding during or shortly after the third stage of labor that measures approximately one pint or more should be considered abnormal and the possibility of severe postpartum hemorrhage borne in mind. Energetic methods during the third stage of labor should be abandoned. Continuous inspection of the vulva and light palpation of the fundus is all that is necessary. The administration of pituitrin immediately at the onset of uterine hemorrhage with relaxed uterus followed by ergot constitutes an excellent method of checking bleeding by means of drugs. The intrauterine gauze pack when used should entirely fill the uterine cavity, care being taken that no dead space remains.

SALVARSAN AND NEOSALVARSAN MYELITIS.

In the *Journal of the American Medical Association* of December 8, 1917, McCaskey reaches these conclusions:

1. Severe and even fatal myelitis may, though rarely, result from even small doses of salvarsan or neosalvarsan given either intravenously or subdurally.

2. This accident may happen without warning in cases in which the same treatment with identical doses had been well tolerated before.

3. It is not always, if at all, due to faulty manufacture, as the same solution has proved fatal to one and innocuous to others given within the same hour both before and after the fatal dose.

4. Wechselmann's conclusion that renal block furnishes the explanation of salvarsan fatalities seems entirely untenable.

5. The most plausible hypothesis seems to McCaskey to be the action of toxic compounds in the form of intermediary bodies with special affinity for the neurons formed in the retrograde changes which occur in the salvarsan compounds, and which may vary in different individuals and in the same individual at different times, and of the exact nature of which we are entirely ignorant.

6. Considering the enormous number of these treatments given, the occurrence of myelitis is so rare that it should be ignored as a negligible possibility.

THE TREATMENT OF SECONDARY ANEMIA IN INFANTS BY BLOOD TRANSFUSION.

In the *American Journal of Diseases of Children* for December, 1917, KERLEY reports several cases referred to him because of anemia and malnutrition. Various food combinations had been tried and all patients had received medical treatment for the anemia.

The blood of the donor was proved fit by the absence of agglutination and hemolysis.

THE BLOOD IN SECONDARY ANEMIA BEFORE AND AFTER TRANSFUSION.

Sex.	Age, months.	Weight, pounds.	Blood before transfusion.		Amount transfused, Cc.	Blood after transfusion.						Weight, pounds.
			Hemoglobin, per cent.	Red blood corpuscles.		Hours after.	Hemoglobin, per cent.	Red blood corpuscles.	Months after.	Hemoglobin, per cent.	Red blood corpuscles.	
F.	12	12.5	14 (Sahli)	2,400,000	175	24	45 (Sahli)	5,120,000	17	70 (Fleischl)	4,600,000	26.8
F.	18	24.0	37 (Sahli)	3,900,000	200	24	55 (Sahli)	5,760,000	14	90 (Fleischl)	5,000,000	32.0
M.	12	16.4	32 (Sahli)	4,480,000	300	24	78 (Sahli)	5,150,000	3	60	3,840,000	19.5
									6	52	4,400,000	22.2
									12	63	5,000,000	25.5
									18	65 (Dare)	5,000,000	28.0
F.	23	15.10	20	2,800,000	140	24	55	3,100,000	1	37	2,700,000	16.7
	24	16.7	30 (Sahli)	.....	200	24	90 (Sahli)	4,320,000	7	.. (Dare)	.....	19.8
F.	6	11.0	37 (Sahli)	1,600,000	150	24	85 (Sahli)	4,000,000	7	65 (Dare)	4,800,000	19.5
M.	10	12.5	33 (Dare)	4,300,000	200	24	58 (Dare)	4,900,000	1	58 (Dare)	5,000,000	12.8*
F.	12	12.4	35 (Sahli)	3,120,000	170	24	62 (Sahli)	4,040,000	1	50	5,320,000	14.0
									3	50	4,140,000	17.4
									6	56 (Dare)	4,400,000	19.8
M.	16	21.0	35 (Sahli)	3,310,000	200	24	55 (Sahli)	3,400,000	1	60 (Dare)	4,500,000	24.8
									6	55 (Fleischl)	4,100,000	25.12

*Died of acute meningitis three months later.

The following instruments were used: Five Record syringes, Lindemann needle, exploratory needle, hypodermic syringe, scalpel, clamps, catgut, silk, and needles.

The following technique was employed: The skin over the median basilic vein was cleaned and cocainized. An incision was made and about 2 cm. of the vein exposed and dissected free from the surrounding tissues. A small opening was made into one side of the vein with a pair of scissors, and a Lindemann needle inserted. The vein below the needle was then tied off and another suture was placed over the vein to hold the needle in place. A small amount of salt solution was introduced to make sure that there was no leakage.

A rubber tourniquet was placed on the arm of the donor and the skin cleansed over the most prominent vein. The exploratory needle was inserted directly into the vein and the blood drawn with a Record syringe until it was full. The syringe was then handed to the operator working on the child and the blood inserted into the child's vein. At the same time a fresh syringeful of blood was being obtained from the donor. Each syringe was well washed out with sterile salt solution before being used again to collect blood. This procedure was continued until the required amount had been transfused.

The immediate and later results are shown in the accompanying table.

The results in all but one patient were satisfactory. Case 4 was transfused twice,

and in each instance there was improvement as shown by the blood examination, but it failed to hold longer than a few weeks. This child made a gain in weight, but the general improvement was not satisfactory. The abdomen was greatly distended, not unlike Hirschsprung's disease. In the other cases there was no return of the anemia, and subsequent growth and development was all that could be hoped for.

Cases 5 and 7 require special mention. In addition to the anemia there was extreme malnutrition. Case 5 was very weak and exhausted to the point of development of small petechial hemorrhages over the body, particularly over the lower abdomen. Several weeks of treatment were required to bring her to a reasonably normal condition. In case 7 the patient was a very anemic twin and failed to grow regardless of the food given. She made a prompt and rapid response to transfusion.

The table shows the weight increase and the blood findings before and after transfusion, but it cannot record the marked change in the patients—the change from sickly, whiny infants into happy, apparently well babies. The patients were transformed from those with a digestive capacity barely able to maintain existence into those that took on the normal constructive processes of early life.

THE SENSITIZATION OF HAY-FEVER AND ASTHMATIC PATIENTS TO THE PROTEINS OF PLANTS AND CEREALS.

To the *Journal of Medical Research* for November, 1917, WALKER and ADKINSON contribute a paper on this topic. They conclude, as the result of their investigations, that patients who are extremely sensitive to the pollen of ragweed are only slightly sensitive at the most, and are usually not at all sensitive to the proteins found in other parts of the ragweed plant. Therefore, parts of the ragweed plant other than the pollen do not cause hay-fever and asthma, and the pollen is the only part of the ragweed that is useful in desensitization.

Patients who are sensitive to corn pollen and its proteins may or may not be sensitive to the proteins of corn seed, and patients who are sensitive to the proteins of corn seed may or may not be sensitive to the proteins of corn pollen.

Patients vary in their sensitization to the individual proteins of each cereal, and to the similar proteins in different cereals. The skin test would seem to be a means of separating very closely related proteins, even when other means, such as chemical and physical properties, fail to do so.

PYLORIC STENOSIS IN INFANCY.

In a contribution to the *Archives of Pediatrics* for November, 1917, RACHFORD claims that the term "pylorospasm" when used in the nomenclature of these cases is in the present state of our knowledge unjustifiable and misleading, since pylorospasm, as a pathological factor in these cases, is associated, sooner or later, with more or less thickening of the pyloric sphincter. The most appropriate term for these cases, therefore, appears to be "pyloric stenosis in infancy." This term does not commit one to the congenital origin of this disease, nor does it attempt to differentiate between the importance of the muscle spasm and thickened muscle in the etiology of this disease. In the term "infantile pyloric stenosis" the etiology of the condition is not hypothecated, and the important pathological condition is definitely stated.

There is perhaps no clinical fact better established than that many cases of pyloric stenosis in infancy have recovered without operation. Rachford's own experience leads him to believe that a large percentage of these cases get well under medical treatment. In the light of pathological and *x*-ray findings in two cases, it seems reasonable to infer that when the gastric and pyloric irritation is relieved by medical treatment, and the case progresses to a satisfactory recovery, the thickened pyloric muscle will gradually disappear when the spasm and irritation are relieved, as it did in one of Rachford's cases. The fact that

the pyloric tumor persists following the recovery of cases operated on by gastroenterostomy is not, in Rachford's mind, inconsistent with this clinical inference, since in these cases the muscular contraction is never relieved, and the pylorus never resumes its normal function.

From a clinical standpoint there is little to indicate that there is any congenital factor in the majority of these cases, except a neurotic inheritance. In the vast majority of cases, as in the three cases he reports, the gastrointestinal canal functionates normally for two or three weeks, and then, following gastric irritation, the typical symptom-group of pyloric stenosis either gradually or rapidly develops.

It is not improbable, however, that some of these cases may be born with a thickening of the pyloric muscle, due to causes acting upon these muscle fibers before birth, but it is altogether improbable, in the light of our present clinical and pathological data, that the majority of these cases so originate.

CAUSES AND TREATMENT OF CHRONIC HYPERACIDITY, HEARTBURN, AND SOUR REGURGITATION.

FISCHBEIN in the *Boston Medical and Surgical Journal* of January 17, 1918, after trying several diets with more or less success, states that he has finally adopted a kind of mixed diet, but without meat, as the latter, at the beginning, disagrees with most patients, the proteids being supplied in the form of eggs, cheese, peas, and string-beans. It is practically a modified ulcer diet, and is sometimes as follows: The first week, the patient is allowed only stale white bread, butter, eggs, milk, cream, buttermilk, cream cheese, and gelatin. The second week are added breakfast foods and cereals, thoroughly cooked, mashed potatoes, and oysters. The third week, vegetables in purée form, such as string-beans, green peas, cooked celery, spinach, asparagus tips, carrots, and turnips; lean fish, such as haddock, perch, flounder, pike, pickerel, all boiled or broiled, and cooked fruits. Lean boiled or broiled meats, as chicken, lamb chops, and roast lamb, are not given until the end of the fourth week in the milder cases, and in the severe cases not until the end of the sixth or seventh week. In the milder cases cereals and light vegetables can be allowed from the start. All smoked and salted meats and fish, spices, raw fruit, raw vegetables, salads, pastry, as well as macaroni and spaghetti, are excluded. It is, however, useless to emphasize the negative side of the diet—*i.e.*, telling the patient what not to eat; it is better and simpler to give him a diet list with instructions to eat nothing but what is on the list.

The diet, as here outlined, has been successful in all cases of pure hyperacidity. Whether it has actually reduced the hyperacidity Fischbein is unable to tell, as his patients refused a second examination with the stomach tube; but the dyspeptic symptoms have disappeared or have been greatly improved in all cases, even when the general nervous symptoms remained the same. Most patients also gained in weight, as the diet, even in the first week, can easily be so arranged as to contain about 4500 calories, which is practically an overfeeding in many cases. These dietetic measures are aided by medicinal treatment in the form of alkalies, which are useful in all cases, and indispensable in those patients who have neither the leisure nor the facilities to carry out the prescribed dietetic treatment, and who must have from the start a diet which, under other circumstances, is not allowed until the third week. The light magnesia and sodium citrate are preferable to sodium bicarbonate, which causes distention by the carbonic acid it generates; and the effects of the alkalies are enhanced by the addition of bismuth and a small quantity of menthol in the following proportions:

> Mentholis, 1.0;
> Magnesii ustæ, sodii citratis, ää 35.0;
> Bismuthi subcarb., 20.0.
>
> Sig.: One-half teaspoonful in a little water half an hour to one hour after meals.

No laxatives are used, as the medicinal and dietetic measures mentioned are suffi-

cient to maintain bowel action, and it is only in exceptional cases that powdered rhubarb root 15.0 is added to the above mixture. Frequent meals, in order to absorb the free hydrochloric acid, as recommended by many authors, have not been found necessary, especially not after the first week, and the appetite improves in most patients when the meals are restricted to three a day.

FOREIGN PROTEIN INJECTIONS IN THE TREATMENT OF ACUTE INFECTIONS.

Cross writing in the *Journal-Lancet* of December 1, 1917, claims that the reactions commonly noted in any of the acute infections treated by intravenous injection of foreign proteins are strikingly similar. With a sufficient dosage, following the injection within a few minutes to forty-five minutes, the patient has a severe chill, the temperature rising to from 103° to 105°, usually between 103° and 104°. The chill has lasted in Cross's case from twenty to thirty minutes. The rise in temperature is usually temporary, subsiding in a few hours, in some instances, to normal. There may be nausea and headache, but usually when the temperature recedes there is a great amelioration of all symptoms, and particularly noticeable in all cases has been the great relief from joint pain.

It would be futile at this time to try to discuss the cause and process of the reactions to foreign proteins. There is no theory at the present time susceptible of proof, although the work of Jobling and Petersen, and others, shows that rapid progress is being made in the study of the split proteins, which we may confidently expect will help to solve these problems.

Miller reports that about 86 per cent of the cases of acute arthritis which he treated by intravenous foreign protein were, apparently, either entirely relieved of their pain and soreness, or greatly benefited by from one to four injections; 6 per cent showed moderate improvement; and 7 per cent were not benefited. Apparently, all observers have agreed that endocarditis, when present as a complication, was unmodified by this treatment. Of 33 of Miller's cases, which had been previously under active salicylate treatment, without benefit, before receiving the foreign protein, all but four were greatly relieved, and promptly, by the intravenous use of typhoid vaccine. He also obtained rather satisfactory results in subacute arthritis. Chronic arthritis, treated during the stage of acute exacerbation, usually showed definite, if only temporary, improvement.

As Cross has had no experience with the intramuscular use of protein, he cannot produce any evidence as to its value. However, opinion at this time seems to be that, in order to result in improvement of symptoms, there must be a definite reaction, such as does not usually follow intramuscular administration. Similarly, it has been found that a patient received benefit from the administration of foreign protein only when it was given in sufficient doses to produce a chill. Evidence is at hand in the literature to show that the intramuscular use of protein seems to be intermediate in its benefit between subcutaneous vaccination with the same substance and its injection directly into the circulation. It must be understood, however, that as yet the substance is so new that a definite conclusion cannot be drawn. We can simply say that by the use of a sufficient dosage of foreign protein substance in acute arthritis, as well as in some other acute infectious diseases, it is often possible to modify some of the worst features of the process and, apparently, in many instances at least, to shorten the disease appreciably without harm to the patient.

TREATMENT OF SYPHILIS WITH "ARSENOBENZOL POLYCLINIC."

To the *New York Medical Journal* of December 8, 1917, Barnett contributes his experience with the preparation made at the Philadelphia Polyclinic Laboratories:

1. Arsenobenzol is the best and safest substitute for salvarsan and neosalvarsan.

2. It compares favorably with the results

obtained in primary and secondary syphilis treated with salvarsan and neosalvarsan.

3. It is non-toxic, whereas every one of the other substitutes such as arsenobenzol billon (French) or the diarsenal (Canadian) are much more toxic, and in some cases more so than even salvarsan.

4. It is best given in 0.4-gramme doses, one week apart. The blood should be tested three weeks after the third injection, and more injections given according to the result of the Wassermann test. The blood should be tested three weeks after subsequent injections. Injections should be stopped when one obtains a negative Wassermann, and Wassermann tests should be made at monthly intervals for the first six months. If it continues negative after that, tests should be made each three or six months and then each year during the lifetime of the patient and symptoms of the disease watched for.

THE RELATIVE GERMICIDAL EFFICIENCY OF ANTISEPTICS OF THE CHLORINE GROUP AND ACRIFLAVINE AND OTHER DYES.

DAKIN and DUNHAM (*British Medical Journal*, Nov. 17, 1917) state that the object of their paper is to point out certain common errors in testing antiseptics of the chlorine group; to examine the claims made by Browning and his colleagues for the alleged vastly superior germicidal potency of acriflavine and certain other dyes; and to indicate how important the matter of the velocity of disinfection is in forming a judgment of the utility of antiseptics in surgical practice, and also the methods suitable for their successful employment. The results of the chlorine group of antiseptics indicate their extraordinarily rapid action. All of the solutions of strengths used in wound treatment effected sterilization in the course of five minutes or less. When insufficient quantities of sodium hypochlorite or eusol are used their immediate action is over, and no undecomposed antiseptic remains, growth of the surviving organisms readily taking place. The efficiency of chloramine-T added to the extent of 1:600 in the mixture illustrates its more potent action than roughly equivalent quantities of chlorine in the form of hypochlorite or eusol. This is no doubt due to its slower rate of decomposition in the medium. Results of experiments with metallic salts, phenol, and hydrogen peroxide show that mercuric chloride added in 1:1000 solution is distinctly more rapid in its action than silver nitrate or zinc chloride. Argyrol was used in very high concentration (1:20), and while it eventually sterilized completely its action was by no means rapid, and only slightly superior to phenol (1:50). The experiment with hydrogen peroxide illustrates its rapid but very transitory effect, which reached its maximum in a few minutes with subsequent unrestricted growth. The action of the dyes is on the whole disappointing. Unchanged persistence of coloring matter cannot be regarded as continuing absence of germicidal action. Acriflavine was not efficient.

In making tests of the germicidal efficiency of any antiseptic there seems to be no good reason for not following the order of mixing the materials indicated by the conditions of their practical use—namely, to add the antiseptic last to the inoculated medium. Under these conditions very different results are obtained with unstable antiseptics, compared with those observed when the organisms are added last. Perhaps the most naive alleged demonstration of the inutility of hypochlorites as antiseptics was that offered by Delbet, who took egg-albumen, added a little hypochlorite of undetermined strength, next heated the mixture for a considerable time, so that all the antiseptic would be decomposed with certainty, and then found, to his evident satisfaction, that streptococci could grow in the residue. Equally enlightening experiments have led various workers into statements as to the excellence of hypochlorite solutions as culture media for B. capsulatus and B. pyocyaneus, but these entertaining speculations need not be seriously considered.

More recently, however, Browning and his colleagues have published a series of experiments on the germicidal potency of various dyestuffs, with results which apparently indicate an enormous superiority for the latter. Numerical ratios for the relative antiseptic potency of the various substances are given, in which the lethal concentration of chloramine-T tested against staphylococci in serum is taken as unity. The lethal concentration of chloramine-T in serum is stated to be 1:250 without reference to much lower concentrations already published by others. The discrepancy is due, in the main, to the fact that the antiseptic was added first to the medium and the organisms last. No indication is given by Browning of the all-important interval of time elapsing between the two additions. From what has been already stated, it is clear that by this method of procedure irregular results are inevitable.

The lethal concentration of chloramine-T in blood serum is slightly under 1:2000 and in 0.7 per cent Witte's peptone between 1:5000 and 1:6000. These figures contrast with 1:250 and 1:2000 respectively given by Browning and his colleagues. The use by Browning of the figure 1:250 for the lethal concentration of chloramine-T against staphylococcus aureus as a standard for calculating the relative antiseptic potency of other substances is clearly misleading.

The fundamental error in Browning's figures for the antiseptic potency of chloramine-T is again encountered in the case of the still more reactive hypochlorite preparations.

It is generally recognized that the testing of substances for their antiseptic or germicidal properties is fraught with innumerable pitfalls, and that by varying the conditions of testing almost any kind of result may be obtained. In the case of disinfectants intended for hygienic purposes, the Walker-Rideal method in one or other of its forms gives a reasonably satisfactory basis for comparison, but with substances intended for wound disinfection no such standard methods exist. Experiment for the determination of the lethal concentration of the germicide acting on various organisms in water, blood serum, or pus usually are regarded as sufficient, and but little attention is paid to such important factors as the time of action, temperature, and number of organisms present.

A great advantage in the use of serum as a medium for the determination of the germicidal properties of an antiseptic intended for surgical use is the fact that it presents a homogeneous medium of fairly constant composition, but it is important to bear in mind that many organisms are very susceptible to the action of blood serum, even though previously heated to 58°-60° F. To avoid this complication, large numbers of the organisms should be used, and fairly resistant types, such as staphylococcus aureus, should be chosen. The use of blood as a standard medium for the testing of the germicidal properties of antiseptics has been suggested by Emery, and this would seem to be a rational procedure in the case of substances intended for intravenous use. Great difficulties are encountered in securing uniform laboratory experiments on the germicidal action of substances upon pus, largely owing to extreme variations in its composition and physical condition, and whether the infecting organisms are free or ingested in the leucocytes. As a substitute for pus, the use of blood as a test medium is of practical value in throwing light on the action of antiseptics in the presence of cellular elements, though the results will be particularly unfavorable to those substances, such as hypochlorites, which are readily decomposed by hemoglobin.

Usually the lethal concentration for germicidal substances tested under various conditions against different organisms is alone considered. But it is becoming constantly clearer that much more than this is needed to form a judgment of the possible value of an antiseptic for wound treatment. A higher concentration of an otherwise inoffensive germicide may easily prove more useful practically than a lower concentra-

tion of a more active compound. The fundamental work of Miss Chick, following that of Paul and Krönig and Madsen and Nyman, has clearly shown that the act of disinfection resembles in many fundamental respects an ordinary chemical reaction in which the two reacting components are represented by bacterial protoplasm and disinfectant. The rate of disinfection varies enormously with different germicides. The mass of antiseptic and that of the bacteria and other reacting substances, as well as the temperature and intimacy of contact between the reacting substances, all influence the result.

A knowledge of the speed of disinfection is important in judging of the most suitable manner in which to employ different antiseptics in actual practice. Thus, as will be seen later, the hypochlorites, chloramine-T, and similar substances in concentration such as are used in practice act with extraordinary speed, completing in a few minutes or even seconds an amount of disinfection which dyes, such as acriflavine, require six hours or more to effect. But in actual use the hypochlorites and chloramine-T are chemically unstable and need frequent renewal unless disinfection has been completed, while frequent renewal of the dyestuffs would add but little to their effect, and actually they are found to be most useful employed as wet dressings, and not for irrigating. The point has been convincingly discussed by Parry Morgan.

In order to obtain information as to the relative speed of disinfection exerted by various antiseptics, the authors determined the progressive change in the number of bacteria in suitable mixtures after varying lengths of time of action. The authors have made use of two media—one a mixture of horse blood serum (1 Cc.) with muscle extract (1 Cc.), obtained by soaking fresh veal with an equal weight of 0.7 per cent salt solution and straining through gauze, but not filtering. The other medium was sterile fresh defibrinated rabbit's blood (2 Cc.). These mixtures were heavily inoculated with a staphylococcus aureus emulsion obtained by shaking a twenty-four-hour agar slant growth with 8 Cc. of a salt solution. After determining the total number of organisms in the mixture by plating an aliquot part, 1 Cc. of the antiseptic solution was usually added and samples withdrawn from time to time and the surviving bacteria estimated. In most cases the antiseptic was added at about the concentration commonly used for wound treatment, though in the case of some of the more active substances lower concentrations were also employed, and occasionally higher ones with the less active substances.

In the case of antiseptics of the chlorine group, their further action in the sample withdrawn for plating was at once checked by addition of an excess of sterile sodium thiosulphate solution, while potassium sulphide was used as antidote with the salts of the heavy metals. No antidote was used in the case of the dyes, and in some cases evidence of inhibition of growth on the plates was noted, due to the mechanical carrying over of some of the dye. Blood-serum-muscle-extract medium was chosen as bearing some similarity to that in which the antiseptics would be used in wound treatment. It has the further advantage of being easily reproduced in fairly uniform quality. For many antiseptics the addition of muscle extract makes the tests more severe than when blood serum is used alone. The experiments were all carried out at 32° to 35° C., and the results are all expressed as the number of bacteria present in one standard drop of the mixtures = 1/40 Cc.

The relative inefficiency of sodium hypochlorite and eusol acting in defibrinated blood is shown. This is apparently due to the ease with which sodium hypochlorite is decomposed by hemoglobin. The fact that an equal volume of the ordinary hypochlorite solutions added to blood infected with streptococci is insufficient to effect sterilization has already been noted by Emery. The superior efficiency of chloramine-T compared with equivalent amounts of hypochlorite acting in blood is very marked, and

is doubtless due to its slower rate of decomposition already noted.

The main facts disclosed by the preceding series of experiments are as follows: (*a*) The rapid and complete disinfection brought about by solutions (one volume) of members of the chlorine group of antiseptics of the strength commonly used in the treatment of wounds, when added to heavily infected blood-serum-muscle-extract mixture (two volumes). (*b*) Under similar circumstances, solutions of acriflavine, proflavine, brilliant green, and malachite green failed to sterilize in six hours mixtures which the chlorine antiseptics sterilized completely in five minutes or less.

Browning concludes from his experiments that acriflavine is 800 times more powerful against staphylococci in serum than chloramine-T. A comparison of experiments shows that a 1:600 solution of chloramine-T can sterilize in six hours an infected blood-serum-muscle-extract which was not sterilized in six hours by 1:1000 acriflavine. The difference in results is striking and deserves comment. One source of error in Browning's experiments has already been indicated, namely, the addition of the chlorine antiseptics to the blood serum before adding the organisms. The authors believe another source of discrepancy is due to the fact that Browning and his associates used extraordinarily few bacteria in their tests, namely, 0.1 Cc. of a 1:20,000 dilution in saline of a twenty-four-hour peptone-water culture. A loopful of this mixture plated on agar yielded "twenty or more colonies." It appeared to the authors that the use of such small numbers of organisms is unsuited for the determination of the germicidal value of substances, for, in the first place, such a low concentration of organisms in the secretion of a wound of long standing borders on "surgical sterility;" hence the experimental conditions are not comparable with those in acute septic wounds. Secondly, if 5 per cent of the organisms in Browning's tests survived they would have a good chance of being entirely overlooked, and sterility might thus be inferred when viable organisms were actually present. Lastly, the bacterial properties of the serum medium become a significant factor when few organisms are used in the presence of native germicidal substances.

Another cause of the marked difference between the author's and Browning's results is the fact that he allowed the antiseptics to act for twenty-four to forty-eight hours before testing, whereas in these experiments subcultures were taken at frequent intervals, which brought under observation the progress of disinfection. The longer period naturally favors a favorable judgment of the slowly acting dyes, while shorter periods are adverse to them.

They conclude, therefore, that the statements of Browning and his colleagues as to the relative germicidal efficiency of chloramine-T and other antiseptics of the chlorine group, compared with brilliant green, malachite green, and acriflavine, are incorrect, and that their mode of testing the germicidal action of the substances studied by them leads to results which are radically misleading.

RECENT SEROLOGICAL WORK ON THE MENINGOCOCCUS.

ANDREWES (*Lancet*, Dec. 8, 1917) calls attention to the difficulty which besets the attempt at classification of bacteria incident to the fact that with species are also found subspecies, which differ only in their serological properties. In some cases the differences are only slight, as in the case of the typhoid bacillus, of which a single strain can be employed for purposes of general immunization. In others the differences are sharply defined, as in the case of the pneumococcus. Here a single strain seems of little value for purposes of general prophylaxis or serum treatment. The differences between such parallel strains are of a very subtle kind and are revealed only in the response of the animal body to the presence of the bacterial protein; slight differences in the latter evoke slightly different antibodies.

The property of immune serum which has chiefly been employed in defining serological races of bacteria is agglutination, though other reactions can also be used, such as fixation of complement or protective power in animals. As regards agglutination, we possess three methods of employment, namely: (1) agglutination; (2) agglutinogenic power; and (3) the power of absorbing agglutinin. Of these three methods the first is the simplest, but the third the most accurate, and of all it may be said that, while a positive result is of definite value, a negative result is not invariably conclusive.

One of the latest organisms to be submitted to close serological scrutiny is the meningococcus, because the recent outbreak of cerebrospinal fever has brought it into prominence.

The state of our definite knowledge on this subject when the outbreak of cerebrospinal fever in England began to assume epidemic dimensions was therefore, shortly, as follows. It was recognized:

That the causal agent in epidemic cerebrospinal fever and in the endemic posterior basal meningitis of infants was the meningococcus. No cultural distinctions could be made between the cocci found in these two affections, nor could any adequate or constant serological differences be established between them.

That the meningococcus was divisible into certain subgroups by serological means, and notably by the absorption of agglutinin test. The number of such subgroups was ill-defined, but they appeared to fall into two main divisions, designated by Dopter "meningococci" and "parameningococci" respectively.

That from the pharyngeal mucus, both of contacts and non-contacts, cocci could often be cultivated which had all the biological characters of the meningococcus. In some cases complete serological identity with that organism could be established; in other cases it could not, and some writers stigmatized such unplaced forms as "pseudomeningococci."

The meningococcus is a single, definite species, recognizable by its cultural characters and fermentative reactions, and widely spread as a pharyngeal saprophyte—often a transitory one. In its most primitive form it is a relatively harmless organism, but even at this stage its protein presents two antigenic components. These two components are rarely evenly balanced, and from a serological point of view there emerges two primary races of the coccus.

For unknown reasons there is a tendency at times for certain strains to increase in virulence, and this is accompanied by an increased complexity in the structure of the antigen, taking different forms in different strains.

When cerebrospinal fever attains epidemic prevalence the virulent strains concerned stand out with relative but not absolute distinctness.

The serological recognition of such epidemic types is of manifest importance, both for the preparation of suitable therapeutic sera and for the sorting out of the more dangerous types of carrier.

Such a conception as this appears in harmony with the observed facts in the recent epidemic, and serves to reconcile the apparent discrepancies in the results put forward by different workers on the subject.

THE REPAIR OF THE NOSE AND JAWS.

In a leading article (*Lancet*, Dec. 15, 1918) this branch of surgery is commented upon as follows:

In the carrying out of the procedures for the repair of the jaws and of the overlying soft parts the fundamental principle must be grasped that the surgeon and the dental surgeon should participate in the work, if the best results are to be obtained. The surgeon will make the flaps, he will implant pieces of bone and cartilage, but unless he has the skilled assistance of the dental surgeon he cannot obtain perfect replacement of the fragments, which only the work of the dental surgeon can give; the coöperation of the two is essential, while at any stage the help of the artist is of enormous value both for the devising of

procedure and for the visualizing of an ideal. In each direction Professor Tonk's aid to the surgeons has been striking.

When the injury to the lower jaw has been great, it is necessary that some rigid support shall be added to replace the lost bone. When the loss is less it may be possible, by careful attention to the position of the fragments, to obtain bony union; natural consolidation may be the work of months, and the expectant treatment thus become worse than more thorough dealing with the condition. But fragments of bone almost separated from the soft tissues may survive and assist in the union of the bone, and it is therefore of great importance not to remove unnecessarily any pieces which give the least hope of survival. Yet to obtain a useful jaw the fragments must be placed and held in a position suitable for their consolidation. Good results can here be got by the employment of dentures and other forms of splints so designed as to keep the fragments in position.

When, however, it is clearly hopeless to expect bony union of the fragments, on account of the large loss of bone, other methods have to be employed. A rib offers great advantages for replacing a portion of the mandible. An osteo-cartilaginous graft can be used and can be so placed that the point of its greatest convexity is in the site of the chin, but in all these elaborate cases it is essential that the soft parts shall be fully formed before the bone or cartilaginous transplant is placed in position. To provide the new soft tissues is not always easy. The cheek can supply only a limited amount of new tissue; if more is taken the resulting deformity will be as conspicuous, nearly, as that which it was proposed to set right. Flaps have to be taken from other parts, and here the ingenuity of the surgeon is greatly called upon. Major H. D. Gillies has employed single- and double-pedicled bridge flaps cut in many new methods. A single-pedicled bridge flap is, of course, made by the transference of a broad flap of skin from a neighboring part over untouched skin, and after ten days or a fortnight, when the flap has taken a firm hold in its new position, the pedicle is divided from the transplant and then replaced in its former position. Major Gillies has improved on this idea; he has employed doubled-pedicled bridge flaps. A broad band is taken, for instance, from the scalp; it remains attached at the two ends, it is then turned down into the new position, and there it is fixed by sutures. The flap benefits by the double blood-supply, so that the risk of sloughing is markedly reduced. When the flap has taken firm hold the pedicles are divided and replaced in their former position. In this way Major Gillies provided one of his cases with a new lower lip and chin, and as the flap was taken from the scalp the patient had a beard also, while a bald head is left for future treatment.

Captain Fry's paper dealing especially with fractures of the upper jaw shows how it is necessary in such cases to support the skin of the face so as to hold it out in the right position. Here the art of the dental surgeon comes into play, for only by means of a prosthetic appliance can the appearance of the face be regained. By steady expansion of the splint the soft parts are molded, with the happy results displayed by Captain Fry's pictures.

VINCENT'S DISEASE OF THE MOUTH AND PHARYNX.

McKinstry (*Practitioner,* December, 1917) states that this disease is very prevalent among soldiers. Out of 230 healthy recruits he found fusiform bacilli and spirochetes in the mouths of 95.

Fuso-spirochetal affections of the mouth and tonsils appear to be distributed over a wide area of the globe. Acute tonsillar affections usually show a seasonal variation. Vincent's angina is commonest in the spring and fall. General ill health and oral sepsis are regarded as predisposing causes of Vincent's angina. The affection does not appear to be highly infectious. Small epidemics have been reported in children's homes. Many cases come from barracks

and billets where patients live in close contact. The exciting cause is an apparent association of the bacillus and spirochete. The bacillus was first called by Vincent the fusiform bacillus. The bacillus is straight or slightly curved, and tapering at each end. It is probably non-motile. It is easily stained with the basic aniline dyes, particularly weak carbol-fuchsin. It is Gram-negative and anaerobic. The spirochete is a delicate organism, about 12 to 30 microns in length. It usually has five or six undulations of wide amplitude. It is quite distinct from the treponema pallidum with eight or ten undulations. It is motile, and takes stains like the fusiform bacillus, being Gram-negative and anaeorobic.

These organisms may be readily displayed by the following procedure: A smear is made from a fuso-spirochetal ulcer, dried, fixed, stained for a few minutes in diluted carbol-fuchsin, dried and examined under the oil-immersion lens, when fusiform bacilli and spirochetæ will be seen, usually in great profusion, mixed up with cocci, bacilli, lepothrices, and other organisms. Sometimes, in severe cases, almost pure cultures of fusiform bacilli and spirochetæ will be found, but these will gradually decrease in numbers as the process of recovery advances.

Fuso-spirochetal affections of the buccal cavity and throat most frequently involve the gums. Indeed this invasion always precedes and accompanies that of other parts.

The gums are usually swollen, retracted, and separated from the teeth, and bleed under the slightest provocation. Sometimes the ulceration is so small, as in the periodontal type, that it is very difficult to detect; its presence, however, can easily be revealed by lightly rubbing over the tops of the gums a small pledget of cotton-wool, when small bleeding points will indicate the denuded parts.

Pain, bleeding, foul breath, and nasty taste in the morning are usually complained of. There is, as a rule, no rise of temperature or constitutional disturbance. The pain may be so severe as to prevent mastication. The bleeding is most noticeable when the teeth are brushed. In many of the cases the patients were compelled to discard the tooth-brush on account of the pain and bleeding excited. The foul breath is somewhat characteristic, but not always noticeable. When the ulceration is confined to the tops of the gums about the necks of the teeth (periodontal type), the submaxillary lymphatic glands are not affected, but when the ulcers are deep and extensive the author has always found the lymphatic glands enlarged and tender.

The ulcer may attack any part of the gums and extend along the whole of both the upper and lower. The ulceration, however, is most frequently found about the necks of the lower incisors, the back molars, stopped or capped teeth, and at the tops of papillæ between irregular teeth.

Some cases develop in a few days, and may involve the whole of the upper and lower gums (acute cases). The pain and bleeding in these are severe, and call for early treatment.

Most cases are chronic and have been running for weeks, months, or even years; in these the pain and bleeding are not so severe, but looseness of the teeth has been complained of.

There is every reason to believe that the so-called "trench gum," occurring among the soldiers in France, is identical with this affection. Several cases invalided home and diagnosed at the front as "trench gum" have been examined and found to present the typical clinical appearances; the microscopical findings have always revealed the presence of the fusiform bacilli and spirochetæ in abundance.

The only condition for which this disease is likely to be mistaken is pyorrhea alveolaris, and this diagnosis was made, and the extraction of the teeth advised, in many of the cases. The fuso-spirochetal affection is distinguished by the character of the ulceration, its liability to bleed, foul breath, and pain. Moreover, there are no pus pockets present, as found in pyorrhea alveolaris. Looseness of the teeth may be complained of, and if an *x*-ray photo of the

gums of these cases is taken, absorption and rarefaction of the alveolar border will most likely be found; but pus can never be squeezed up between the tooth and gum, unless pyorrhea alveolaris is present as well.

These clinical findings, corroborated microscopically by the finding of many fusiform bacilli and spirochetæ, complete the diagnosis.

As to treatment, cleanliness is of first importance; thereafter the application of an alkaline salvarsan solution, double the strength ordinarily used for intravenous injections, swabbed upon the affected parts. This treatment is continued daily, or twice daily, until smears from the gums show no fusiform bacilli and examination shows no bleeding points. As to the affection when it involves the tonsils, the author states that in not a single case of Vincent's angina has he failed to find the gums affected, and notes that the patient rarely looks or feels ill. He usually complains of pain or discomfort in the throat, increased on swallowing, occasionally darting up to the ears. He may have headache and indefinite pains in the limbs. The lymphatic glands become enlarged and tender. On the tonsils will be seen a soft, whitish, creamy-looking membrane, which can easily be removed with a swab, leaving behind a deep ragged or punched-out ulcer, with a bleeding base. This is the deep type of ulcer. Or a thin, whitish membrane will be found covering part or both tonsils, impossible to remove by gentle brushing, but which if removed leaves a bleeding ulcer. If removed the wound is found to have a foul smell. At times the ulcers are acute and extend with extreme rapidity in both surface and depth. Most of the cases recover in ten or eleven days. Diagnosis is made by a direct smear, which is fixed and stained with a weak solution of fuchsin and methylene blue. The possible coexistence of diphtheria and syphilis must never be lost sight of.

As to treatment, cleanliness of the mouth and the application of salvarsan represent the most efficient form.

THE VALUE OF DIAGNOSIS IN BACK LESIONS.

Sever (*Boston Medical and Surgical Journal*, Dec. 20, 1917) records the circumstance that for several years he has, for the Massachusetts Industrial Board, seen many cases of stiff and painful backs. A large number of these cases showed fractures of one or more vertebræ, which had wholly escaped notice, and therefore treatment. Cases having gone for periods of time varying from weeks to a year were not diagnosed, and no treatment. Practically all of the persistent back disabilities of the severe type are the result of falls. Simple back sprains from lifting and bending are of short duration. A compression fracture of the vertebra is one where the body is crushed or flattened, unevenly, more on one side than on the other. As a rule the vertebræ are more compressed or crushed on the anterior portion than on the posterior. It generally follows severe violence, applied through the long axis of the spine, or while the spine is forcibly flexed. Falls on the buttocks, shoulders, or back, or landing on the feet from a height, combined with forcible flexion of the spine, are the most frequent causes.

These compression fractures are commonest at the level of the first lumbar vertebra, and are not limited to one vertebra, often several being involved. A certain number of cases show kyphosis, but this is not a constant factor. This kyphosis may become more prominent during convalescence or may be entirely absent. These cases as a rule complain only of a stiff and painful back and have no tenderness over the site of fracture. Even if there be paralysis in these milder cases it is temporary. The pain, stiffness, and disability continue indefinitely, but may get less. In the cases reported diagnosis was not made for an average period of four months. Several went for a year. Some of these cases show definite signs of injury to the cord.

Treatment should be adequate fixation of the spine in plaster jacket at first, and by back brace. The whole period of treatment

will probably be covered by several years. As a callus forms about the fracture the spine loses its resilience, especially to side bending, but the weakness and some soreness persist, especially after exertion. It is obvious these individuals are totally disabled for further heavy work. It is stated that once a laborer has had a compression fracture of the spine, he had better begin to look for some other kind of a job.

JEJUNOSTOMY: ITS INDICATIONS AND METHODS.

DR. CHARLES H. MAYO (*Journal-Lancet*, Dec. 15, 1917), of the Mayo Clinic, observes that jejunostomy is an operation which, fortunately, is rarely required, but when indicated it is to be classified among the life-saving, or, at least, the most important palliative, surgical procedures. The term "jejunostomy" is often applied when, in making an enterostomy to relieve obstruction, the small intestine is opened. "Enterostomy" would be the more correct term, as the opening is made in a distended loop of small intestine, very often regardless of whether it is jejunum or ileum. On the other hand, when enterostomy is made for purposes of nutrition the jejunum is chosen, and the opening is made in its first loop.

In cases of obstruction of the small bowel (the so-called ileus) following operation, enterostomy should be done as soon as the evening of the third day or on the fourth day following its inception. The fifth day may be too late. Such obstruction may occur directly after an abdominal operation or several days later following an apparently normal primary convalescence. Nearly all the cases seen are those which follow operation or are acute obstruction from some unknown cause, and when the enterostomy is made the patient is usually too seriously ill to warrant prolonged or extensive exploration.

Handley has suggested a jejunal colostomy in such cases. This is an extra procedure on very sick patients, and makes a permanent enterocolostomy, which is only occasionally necessary, a temporary vent being sufficient. It is often difficult to determine whether a high or low opening is made in the bowel; and such a high communication with the colon would possibly develop later trouble.

When the operation is done as an enterostomy for obstruction, it is supplemented by rectal feeding of glucose and fluids. The stomach is also washed every six to eight hours until it is found clear. The operation is most effective when the obstruction is due to local peritonitis, in which case the local condition will persist for, approximately, a full week. When the obstruction is from diffuse peritonitis the operation is less effective, but well worth making, as, with the gastric lavage and drainage, some patients may be tided through the temporary period of paretic obstruction and relieved from the toxemia of retained and absorbed intestinal fluids.

Jejunostomy for purposes of nutrition would be indicated with wide-spread cancer of the stomach obstructing the cardia and leaving but little room in its contracted and cancer-involved wall for gastrostomy. Patients in this condition are half-starved, there is often extreme exhaustion, and it may be impossible or inadvisable to make an extensive preliminary *x*-ray examination. Gastrostomy in such instances adds to the patient's pain; on the other hand, a jejunostomy will rest the stomach and give immediate relief. Patients have gained from ten to thirty pounds following jejunostomy; and with complete rest of the stomach the cancer made slower progress. The operation is advisable in case of extensive laceration of a cancer of the stomach made accidentally during an exploratory examination. Mayo-Robson advises it also in linitis plastica and in extreme cases of vomiting of pregnancy. The operation is so easily and quickly done that the author sometimes wonders it is not more commonly chosen in cases of nervous vomiting of girls of from eighteen to twenty-five years of age, instead of the stages of operative procedure, such as the removal of an ovary, then an appendix, then the fixation of a movable kidney, drainage of the gall-bladder, and,

finally, a gastroenterostomy, as so often is done in a series.

The operation for purposes of nutrition is performed through a midline or left lateral incision, the upper loop of jejunum being found beneath the transverse colon and the omentum. When the operation is for the relief of obstruction it is best to reopen the former incision unless it is infected. If there is no general peritonitis and the obstructive condition is recognized early, the patient will not be *in extremis* and the operator may explore the region of the primary operation. Not infrequently bands of adhesion or kinks may be separated, at once reducing fluids and gases which pass along the bowel with audible gurgling. The enterostomy will not then be necessary. If enterostomy is considered necessary, a distended loop of bowel is stripped of fluids for a few inches and rubber clamps adjusted to keep the loop empty. The bowel is perforated opposite its mesentery, and a No. 10 English catheter is inserted a few inches into the lumen of the gut. A purse-string suture adjusts the bowel to the catheter, and the needle passed through its side fixes it in position. The suture may be chromic catgut or silk; if the latter, it comes out with the catheter. The catheter is depressed into the wall of the bowel, and its folds are sutured over the tube for an inch and a half; and a perforation is made in the adjacent omentum, and the catheter passed through it. The use of the omentum in this way aids in preventing leakage after the removal of the catheter, and adds to the mobility of the intestine after the operation. The catheter may be brought out through the incision, in which case sutures are passed through the peritoneum, the omentum, and the intestine on each side of the tube, to hold it in position. In some cases a small perforation is made through the abdominal wall, a little to one side of the working incision, and sutures are adjusted beneath the opening. When the perforation is made for obstruction it is usually sufficient to leave the catheter in place from seven to twelve days. When made for the purposes of nutrition it is permanent in case of cancer, and is left as long as necessary in cases of persistent vomiting, since the stomach may be tested at any time, employing the tube when necessary.

The operation of jejunostomy has been made in the Mayo Clinic in 43 cases for nutritive purposes since 1910. In the larger number of the cases the operation was necessitated by cancer, and it was palliative. Because of the serious condition of the patients the primary mortality was high, and the palliation brief. The operation is not of great utility except in a few rare cases of non-malignant obstruction, or for the temporary relief of gastric fistula following perforation and operation. Twelve of the 43 patients died within a week, four died within a month, four within two months, seven within a year, and three within a year and a half. Thus in all of these cases the operation served its purpose, namely, that of affording temporary or permanent relief of the condition which necessitated the operation.

Jejunostomy for nutrition is of occasional value; jejunostomy or other enterostomy for intestinal obstruction is of great value.

TREATMENT OF WOUNDS BY SOAP IN CASUALTY CLEARING STATIONS.

Dixon and Bates (*Lancet*, Nov. 24, 1917), following the practice of some French surgeons, used soap dressing on 368 cases. In the same period they treated cases with other antiseptics, including eusol, hydrogen peroxide, and B. I. P. P. As a result they are now using more soap and fewer antiseptics.

A sample of common yellow soap was analyzed and found to contain, per cent: Water, 24.6; fatty acids, 63.0; combined alkali, 4.6; free alkali, *nil;* impurities, 7.8. This was considered suitable, and it was found possible to make a 2½-per-cent solution of it.

This was first tried in small open muscle wounds in which there was no gas gangrene. After being opened up, and metal and cloth removed, the wounds were dressed with sterile gauze soaked in this solution. This

dressing was left undisturbed for two, three, or four days, providing there was no rise in temperature. At the first dressing the most striking features were less pain, the unusually clean appearance of the wound, absence of pus, and the redness of the whole of the tissues—the muscle in particular.

The dressing was next tried in deeper wounds, using Carrel's tubes in the ordinary way. Here difficulty was found with the ordinary soap solution; it was too gelatinous to flow at all well down the tube. A 2½-per-cent solution of the B. P. soft green soap was then tried, and found to be quite satisfactory.

The results were most encouraging. Cases of penetrating wounds of the knee-joint were treated by this method. The cases did very well. In cases of gas gangrene the results are usually good. The points claimed for the soap solution are that they clean up a wound quickly, the dressings are much less painful than ordinary dressings, there is a saving of labor as the dressings need only be changed every three or four days, the solution is easily procured, easily made, and cheap.

SKIN DISEASES AND THEIR TREATMENT UNDER WAR CONDITIONS.

MacCormac (*Urologic and Cutaneous Review*, December, 1917) notes that in war scarcely any battalion is free from itch. In France manifestations of the disease differ in some important features from those seen in civil life. The hands are often entirely free from lesions, whilst interdigital burrows are only present in about 13 per cent of the cases. The problem is further complicated by the lesions incident to lice which are practically universal. Moreover these latter lesions closely resemble those of itch. The louse, however, never attacks the penis, whilst this organ is frequently attacked in scabies. Neither itching nor interdigital burrows, of so much value in diagnosis in civil life, can be regarded in this light in the army. Impetigo of the buttocks is pathognomonic of scabies, and every patient with boils should be regarded as suspicious as they form 28.4 per cent of the pyodermic complications either alone or associated with impetigo. As to the losses occasioned by itching, when a severe pyodermic infection occurs, there is an average loss of time of 31.7 days. If possible to prevent or give early treatment to scabies a very large number of hospital beds would be free for other purposes.

Any method of treatment to be successful must fulfil three conditions: burrows must be opened to permit access of the parasiticide to the insect and ova; the parasiticide should be of such a nature as to destroy the parasite without producing dermatitis; and, finally, to prevent reinfection, contact clothing and blankets must be disinfected. The first of these conditions is achieved by a hot bath, soap, and a soft brush; the second, by the application of sulphur ointment twice daily for three consecutive days; the third, by any steam pressure or sulphur vapor apparatus. The treatment to be effective must be conscientiously carried out. The ointment must be thoroughly rubbed into the whole body below the neck. Indeed, the soaking and the application of the sulphur ointment should be superintended by a medical officer and carried out by a skilled orderly. Many remedies have been used, such as the balsam of Peru, betanaphthol, etc. None is universally satisfactory. Many of the lesions of scabies still persist at the end of treatment, and the remedy employed may itself occasion some slight degree of itching. Discovery of the acarus is the only absolutely certain proof that the man is still uncured. In cases in France the acarus is extraordinarily difficult to find, even in well-marked untreated cases.

The impetigo which is found associated with scabies is of the ecthymatous type, and is caused by streptococcal infection. It is relatively common. The primary scabitic lesion may be slight and readily overlooked. Although scabies constitutes the major cause of the usual form of crippling from skin disease, the impetigo occurs with comparative frequency. It probably corresponds to the ecthyma in type. It mostly

involves the legs and thighs and may be very wide-spread. The elementary lesion consists of an ulcer, often astonishingly deep, covered over by a thick black crust, beneath which pressure brings out an ooze of pus. Not uncommonly the disease is followed by warty growths. There is also a linear variety which is noted. Remedies employed must come in intimate contact with the affected skin surface; antiseptics, no matter how mild, almost invariably aggravate the disease. In the early stages calamine liniment acts admirably. After the preliminary shaving lint soaked in this substance is applied to the head and face. On the body weak sulphur ointment with strong perchloride lotion has proved a satisfactory treatment. The striking resemblance of this condition to impetigo contagiosa tempts medical officers to use mercurial ointments, with invariable failure. The rapidity with which calamine ointment effects improvement is astonishing.

General tonic treatment is always desirable. A curious form of papular urticaria seems to be common, involving the anterior axillary folds and abdomen chiefly, producing with the associated itching a picture closely resembling scabies. This condition subsides spontaneously after a few days' rest. Relapse is frequent. Sometimes it may be associated with definite wheals, which point out the nature of the affection. Psoriasis was observed in a considerable number of affected soldiers. The type met with was severe, almost invariably affecting the scalp. Chrysarobin was the most effectual remedy in removing the disease from the body.

IMPROVED APPARATUS FOR COMPLICATED FRACTURE OF THE THIGHS.

SHERWOOD-DUNN (*American Journal of Surgery*, December, 1917) states that no matter how shattered the bone may be or how much of the shaft of the bone has been destroyed, if the main arteries remain to insure proper circulation, every effort is put forth to save the limb. A description is given of an apparatus which he commends because of its simplicity, lightness, power of complete immobilization, it facilitating the easy and painless transfer of the patient, allowing change of dressing without movement, permitting free massage of the lower limb and active and passive mobility of the articulations, and finally reduction of the fragments by continuous elastic traction.

For the construction of the apparatus one needs plaster of Paris, tarlatan, large-sized rubber tubing, adhesive zinc plaster, and hoop iron.

The ordinary hoop iron used in France measures 23 mm. wide, 3 mm. thick, and the amount necessary to make the apparatus will not weigh more than three pounds, which, of course, is one of its advantages and forms the chief point of difference and utility of this over other appliances, as it takes the place of the plaster-of-Paris dressing in which the limb has heretofore been encased.

We start with this hoop iron at the antero-superior spine of the ilium and model it along the line of the hip, down to a certain point, when it is bent abruptly outward, downward, and inward to form a half-circle to correspond with a similar half-circle formed by a piece modeled from the crotch of the inside of the thigh, downward to the knee-joint; these circles allow free manipulation and change of dressings.

Starting with another piece from a point about 10 cm. up on the one just shaped we carry it down to a point 20 cm. below the plantar surface of the foot, bend it square across, and carry it up on the opposite side and again about 10 cm. past the end of the piece descending from the crotch. These two ends are now riveted together on each side, and this rivet permits of the flexion of the knee-joint.

To prevent involuntary flexion and render the apparatus rigid a metal ring is adjusted to slide from below upward over the two riveted ends.

In the space between the plantar surface of the foot and the stirrup formed by the banded iron will be arranged the traction in extension upon the limb.

To apply the apparatus, first make a plaster spica of the pelvis and upper part of the

thigh. That applied to the thigh must form a firm solid collar, as it will be called upon to support firmly the upper extremities of the band iron.

If the lesions of the soft parts are high up they can be covered by the spica, which can later be cut away as may be necessary after the collar has solidified and dried. The author insists upon the spica formation, since he has never been able to construct a belt that would safely support the necessary strain upon the band iron without it.

The anterior part of the collar surrounding the thigh above the arcade is widened so as to later allow a little flexion of the hip-joint.

The making of the pelvic hip spica plaster bandage ends the work for the first day and it is permitted to dry.

The following day the band iron stirrup is accurately adjusted so that the riveted joints come exactly opposite the articulation of the knee and the two bands on each side are exactly upon the same level; then the upper ends are carefully and firmly anchored and caught by aid of plaster bands to the collar made the previous day.

Next after sponging the surface with alcohol he applies a bandage of adhesive zinc plaster, the superior ends of which, divided, cross over the front of the tibia; then a small, flat piece of wood is placed about midway between the sole of the foot and the band iron stirrup and held in place by a band of adhesive zinc plaster passed around it and fastened to the straps on the calf of the leg on each side, which in turn are held in place by circular bands of adhesive zinc plaster above the malleolus, at the narrowest part above the ankle. These bands must be observed daily, as the continuous traction to be exerted upon the wooden stirrup has a tendency to loosen them.

This continuous elastic traction is established by a piece of rubber tubing attached at one end to the metal stirrup and at the other to the wooden one.

The limb is supported and held in position by aid of three strong linen bands attached to the band iron frame: one at the thigh, one at the popliteal space, and the third at the level of the calf of the leg.

When there is a tendency to talipes equinus the foot can be readily held in position by a band placed at a level of the toes and held back by cords fastened to the iron frame each side. The patient is placed in bed supported by pillows under the hips in such a manner that the limb is held clear of the bed mattress and is supported upon a level with the iron frame of the foot of the bed, thus insuring free play of the elastic traction upon the limb between the stirrups.

REGIONAL ANESTHESIA OF THE UPPER LIMB.

ACHARD (*Progrès Méd.*, Par., 1917, p. 323) says that the methods of regional anesthesia of the upper limb devised by Kulenkamff and modified by Satoni are blind, more or less dangerous, and do not always give a sure result.

Achard proposes a method which, although it has the disadvantage of occupying about thirty minutes in execution, yet is absolutely without danger and is sure. The technique is as follows:

The patient is put in the classic position for ligature of the subclavian artery.

Under local anesthesia an incision from 1 to 2 cm. long is made along the upper edge of the clavicle. This will be outside the artery. After making the incision, if the venous confluence is directly met it is pushed inward and upward in the manner opposite to that done in the operation for ligature of the subclavian artery.

The aponeurosis is incised, and immediately at the bottom of the incision the white cords of the brachial plexus are seen, reduced in this spot to three nerves only.

Five cubic centimeters of five-per-cent novocaine are then dropped in the bottom of the wound; a few moments later an injection of 1 Cc. of two to four per cent novocaine is injected with a fine needle under each of the three nerve sheaths. A bath of 10 Cc. of one-half per cent novocaine is given to the whole region, and a suture of the aponeurosis and teguments is made by a couple of stitches in one row.

Anesthesia is certain because every nerve has been seen.

There is no fear of any arterial lesion because operation is done quite openly.

As a general rule anesthesia of the upper limb by this method is complete at the end of ten minutes, and it is prolonged to one and one-fourth hours.

The author adds that it is essential that a concentrated solution, two to four per cent, be used in injecting the nerves because the more voluminous a nerve cord the more necessary it is to have a concentrated solution in order to reach by osmotic tension not only the superficial fibers, but also the central fibers, and it is on account of the high contents of the liquid in an anesthetic substance that only a small quantity is employed.—*Surgery, Gynecology and Obstetrics,* February, 1918.

METHOD OF PREPARING AND USING RADIOACTIVE SUBSTANCES IN TREATING DISEASE AND OF ESTIMATING SUITABLE DOSAGE.

DUANE (*Boston Medical and Surgical Journal,* Dec. 6, 1917) describes the scientific principles employed in the preparation of the applicators and of the instruments for measuring their radioactivity, and gives a brief statement of the kinds of cases in which the various methods are used and the dosages actually employed.

Radium is a chemical element belonging to the group of metals, but unlike most other elements it is not extraordinarily stable. It transforms itself at a measurable rate into another substance called radium emanation. The rate of transformation, however, is so slow that about 1700 years would be required for half a given quantity of radium to disappear.

The emanation is a chemically inert gas, and it, too, transforms itself into a third substance called Radium A; but this is not all. Radium A transforms itself into Radium B, and Radium B into Radium C, etc., thus forming a series of substances related to each other as father to son. The last of the line known to exist is Radium F, also called polonium; which, as a matter of fact, was the first radioactive substance discovered by the Curies. Considerable evidence also has been collected of late years in favor of the supposition that polonium transforms itself into lead.

None of the above substances are gases except the emanation. Radium A, B, and C deposit themselves on anything and everything that comes in contact with the emanation, including the walls of the vessel that contains it. For this reason, Radium A, B, C, etc., frequently are grouped together under one name, and called collectively "deposited activity." These substances transform themselves much more rapidly than their grandparent, radium itself, does. Half a given quantity of emanation disappears in three and eighty-five-hundredths days; half a given quantity of Radium A, in three minutes; of Radium B, in twenty-six and eight-tenths minutes; of Radium C, nineteen and five-tenths minutes, etc. Thus the emanation lasts longer than the deposited activity; the former's life being measured in days, and the latter's in minutes. These substances differ from each other very much in their physical and chemical properties, but they have one characteristic in common, they are radioactive.

By radioactive substance we mean a substance that continuously emits peculiar types of invisible rays that differ substantially from light and heat rays. The radiation from radioactive substances, if sufficiently intense, destroys tissues, and this fact forms the basis of the therapeutic applications of the radioactive substances. In such applications, one or more of the radioactive substances, in a special container, is placed in or near the malignant growth to be treated, or is injected into the growth in the form of a solution, and the rays from the substance, passing through the tumor cells, destroy them.

Among the above-mentioned substances, Radium C produces by far the most penetrating rays. Radium B also emits some penetrating rays; but neither radium nor the emanation produces rays that are capable of passing through the walls of the glass

tubes in which they are usually kept. "Why, then," it may be asked, "are tubes containing radium used for therapeutic treatment?" The answer is that they are not so used until the radium has been in them long enough for the Radium B and C to accumulate. When this has occurred, the only function fulfilled by the radium is to supply Radium B and C as fast as they destroy themselves, the latter being the real source of the penetrating radiation.

It follows, therefore, that if by suitable means we deposit Radium B and C on an applicator or in a tube, we can use the applicator or tube to radiate tissues, just as if it contained radium itself, and this is the fundamental principle of the methods about to be described.

The deposit of Radium B and C can be obtained in a variety of ways, of which the following may be mentioned:

The emanation may be extracted from the radium and pressed into a glass or metal container of any desired shape and size, and the Radium ABC allowed to accumulate in it. The container is then ready for use, either with or without the emanation, according to the length of time required for the treatment. The emanation, if left in the container, simply prolongs the time during which the activity lasts, by keeping up a supply of the Radium BC. The emanation itself does not add to the penetrating radiation.

Radium ABC may be deposited on sheets of metal or other substances by leaving them for several hours in contact with the emanation contained in the closed chamber. The sheets are then attached to the tissues to be radiated by adhesive plaster or otherwise.

Radium ABC may be dissolved in water or other liquid, either by dissolving the purified emanation and allowing it to transform itself into Radium ABC, or by depositing the Radium ABC on grains of salt (or other substances) and then dissolving the salt in the liquid. In this way a large amount of activity can be put into a few drops of liquid. The liquid is then injected in the tissues or blood-stream.

In order that these methods shall be of practical value, it is necessary to have an efficient machine for collecting and purifying the emanation. Such a machine was designed several years ago by the writer.

The general principles of the method are those previously employed by Ramsay and Soddy, Rutherford, and Debierne, in some of their most important researches. The advantages of the method described below are: that the purification does not require liquid air; that a large number of millicuries of emanation can be purified and compressed into a small fraction of a cubic millimeter, in ten or fifteen minutes of time; that no emanation is lost except that due to its natural decay; and that the process may be repeated a great many times without renewing parts of the apparatus.

The apparatus has been used by Duane for more than four years. The bulb contains over 920 milligrammes of radium (element), and the total quantity of emanation purified per month amounts to more than 4.5 curies of emanation. A curie is the quantity of emanation in equilibrium with one gramme of radium (element). The emanation can be put into tubes which are very much smaller than the tubes would have to be to contain an equivalent amount of radium. Moreover, a great variety in the size and shape of the applicators can be obtained.

The first step in a quantitative estimate of dosage is to measure the quantity of radium, of emanation, or deposited activity, as the case may be, that the applicator contains.

Duane describes in considerable detail the quality of measures and their application. Thereafter are reported cases of epidermocarcinoma, illustrated showing the large size of the lesion and given in sufficient detail to show the high efficiency of the emanations, which are allowed to act for weeks at a time.

The question as to the effects produced by a small quantity used for a long time, as opposed to a large quantity used for a short time, has not been definitely decided for all cases. In the above treatment the time element was very large, for the tumors were subjected to continuous radiation for six

weeks or two months at a time, the intensity of the radiation being correspondingly small. Thus the time element was enormously increased at the expense of the intensity element. The method has another great advantage also, in that the most energetic of the radioactive rays are used to their fullest extent. The walls of the glass tube being very thin, they absorb very little radiation. which means that a very large percentage of the radiant energy is absorbed in the tissues within a few millimeters of the tube. The distance to which the radiation extends depends to a considerable extent upon the thickness of the glass. In general, the tubes are such that the destructive action on normal tissues caused by the rays extends to a distance of 7 or 8 millimeters. Under these conditions, epidermoid carcinoma tissue will be destroyed at a considerably greater distance. If it is desired to extend still further the limits of the destructive action, larger doses must be used.

In spite of the fact that the radiation of the tumor lasted continuously for six or eight weeks, no destructive effect was produced on neighboring healthy tissues. A slight erythema, however, appeared for a distance of 2 cms. or so around the lesions.

The method of inserting glass tubes through a trocar can be applied only to cases in which the lesion occupies a certain volume. Conditions in which the epidermoid carcinoma tissue is distributed in a more or less thin layer, over a large or small area, must be treated in other ways.

In the first group of cases the large percentage was epidermoid carcinomatous. The second group sarcomatous.

The method of treating these cases differs fundamentally from that employed in those previously mentioned. Only the penetrating gamma radiation is allowed to pass through the tissues, the filtration being two millimeters of lead, and about 2 to 3 cms. of gauze; sometimes, also, the applicator is held on a brass frame at a distance of 6 or 7 cms. from the skin, in order to reduce the skin effect in proportion to the radiation of the underlying tissues. The gamma radiations that go through this amount of matter carry with them an exceedingly small quantity of energy, and it is one of the most extraordinary facts connected with these mysterious substances that such a small quantity of energy can have any appreciable effect on such large masses of living tissues.

As is well known, *x*-rays produce marked alleviation in cases of myelogenous leukemia, and the fact that radium also has much the same effect was observed in Paris years ago. The best method of treating leukemia with radium is substantially that described above in the case of malignant lymphomata. The emanation tubes, in a lead box with walls about two millimeters thick, are placed at different positions over the spleen, and left there from four to six hours, when they are changed to other positions. There is a chart given representing the effect of the radiation on the white cell count of the blood, the figures giving the dosage. The first figure represents the number of millicuries, and the second the number of hours of treatment, respectively. It will be noticed that every series of treatments is followed by diminution in the white count, even though this is given after a large number of recurrences.

The fact that there is a general decline in the magnitude of the recurrences during the three years in which the patient received treatment is the most hopeful characteristic to be noticed. Attention is called to the fact, however, that larger doses have been used the last few months than before. This chart refers to a case reported, and photographs representing it are also given. These photographs show the diminution produced in the size of the spleen during the first part of the radiation. The spleen has remained small ever since.

Here, again, the size of the effect produced by a small amount of radiated energy is noteworthy. It would take rather delicate chemical tests to discover the chemical change produced by this radiation in so large a quantity of matter.

An exceedingly interesting study of a large number of cases of leukemia treated with radium will be published by Dr. Peabody in a special article on the subject.

THE INTERNAL SECRETION OF THE TESTES.

WHEELON (*Interstate Medical Journal*, December, 1917) states that Kollicker and Leydig pointed out the constant presence of the interstitial cells, not only in the interstices of the seminiferous tubules, but also in the mediastinum and connective tissue septa of the testes, and under the tunica albuginea.

Leydig's cells are of mesenchymal origin, and appear in the primitive genital tract at an early phase of embryonal development, before the seminal cells have formed their cytological character. These cells vary greatly in the same species from time to time, also in different species, and lie surrounding the capillaries going to the seminiferous tubules. They are irregularly polygonal in shape. The nucleus lies eccentrically, and is surrounded by a condensed endoplasm which passes into a less dense vacuolated ectoplasm. Soluble and insoluble pigments are common constituents of the interstitial cells of many animals. Whitehead, from his microchemical study of Leydig's cells of the pig, has shown that they possess in their cytoplasm definite granules. Fat is never entirely absent.

Lecaillon found in moles that the interstitial tissue of the testes is functionally active during the breeding season, when the testis is 64 times larger than during the resting period.

Bouin and Ancel demonstrated that the cells of Leydig, which they call the interstitial glands, perform all the functions of spermatogenesis with which the internal secretion of the testicle has been credited. Subsequent work adds further evidence to this conclusion. In the testes of old animals and senile men there is a distinct and marked diminution of the cells of Leydig as a protective action on the part of the genital glands. There are evident signs of atrophy, as shown by the profusion of pigment in the cytoplasm and the absence of other enclosures.

Albers-Schönberg demonstrated that the Roentgen ray exerts a profound deleterious effect upon the male genital glands. He found that the cells of Leydig and the cells of Sertoli remain in a normal condition after exposure to the *x*-rays. These rays cause azoöspermia through the arrest of the spermatogenic function of the testes.

Philipp in one case exposed the testes for ten or fifteen minutes daily for thirty days. At the end of treatment the semen contained the normal number of mobile spermatozoa. The second patient was treated for pruritis ani, receiving 145 minutes exposure in twenty days. Seven months later the semen contained no spermatozoa. Brown reports that every one of 18 manipulators of *x*-ray generators for several years past, whose semen he examined, showed complete or almost complete absence of spermatozoa. The subjects were men of robust health, ranging in age from twenty-two to forty years. None of them had observed any signs of impotence. None of the married men had begotten a child since the beginning of *x*-ray work. The testes seemed normal in size and consistence; the semen rather abundant, but contained no spermatozoa.

This interesting subject is summarized as follows:

It has been shown that the cells of Leydig act as secretory cells and that pathological conditions alter their normal activity.

The observations on cryptorchid individuals demonstrate that the development of secondary sexual characters is independent of the presence of functioning spermatic tissue. The selective action of the *x*-ray gave further evidence of the same fact.

The effects of vasectomy upon the somatic characters have been shown to be negative, the presence of the interstitial cells being sufficient to produce all the secondary characteristics of maleness.

It seems evident that the presence or absence of Sertoli's cells and spermatic cells does not affect the secondary sex characters, and that the internal secretory function is the sole property of the interstitial cells. This tissue not only exercises a protective influence, but it determines the appearance of the somatic male characteristics.

The behavior of Leydig's cells during the embryonal period and at other times of development points to the same conclusion.

The first appearance of Leydig's cells in the embryo precedes the sexual differentiation of the primordial genital cells. The structure of the former indicates an exceptional degree of activity during embryonal life. The normal development of the secondary characters in the course of post-natal existence can be ascribed only to the function of this tissue. From birth to about the beginning of puberty, at the time when somatic sexual divergence is least clearly marked, the interstitial cells undergo the minimum relative development.

These cells of Leydig, although of mesodermal origin, are able actively to produce certain specific substances in the blood stream; such being the case, Bouin and Ancel felt justified in calling them, in their totality, "an interstitial gland."

From the evidence set forth we may conclude, with Corner, that "a man's male plumage is in direct proportion to the weight or amount and activity of testicular (interstitial) tissue present."

STERILIZATION AND PURIFICATION OF WATER WITH ISOTONIC SODIUM HYPOCHLORITE SOLUTION.

FRALICK (*Medical Record*, Feb. 9, 1918) notes that Manheimer conducted tests on this solution with very heavily infected sewage organisms and obtained 99.6 purity, using a 1-per-cent solution of the chemical in 8000 parts of water. He observed that at the present time the disinfection of water in emergency outfits using chloride of lime, while effective in water sterilization only if an excess of chemical be used, is objectionable on account of the taste and slightly poisonous character of the water resulting. He states that the troops avoid drinking this water whenever possible. The author suggests the purification of water by the use of the isotonic sodium hypochlorite solution as a disinfection and the neutralization of the excess NaOCl by peroxide of hydrogen $NaOCl + H_2O_2 = NaCl + H_2O + 2O$. The water thus neutralized is entirely free from any objectionable or even noticeable taste or odor, while bacterial tests demonstrated its freedom from microörganisms.

ON THE TREATMENT OF GUNSHOT WOUNDS WITH A SOLUTION OF SOAP AND WATER AND PRIMARY SUTURE.

HAYCRAFT (*British Medical Journal*, Jan. 19, 1918) uses a solution of 1 to 40, employing pure hard soap obtained in blocks and cut into shavings and then dissolved in hot water which has been previously boiled. The stock solution is 1 to 20 diluted with an equal volume of sterile water. Superficial wounds are completely excised and soap solution is well rubbed into the surface. They are then stitched up. In single penetrating wounds the skin wound is completely excised, the exposed surface of the wound in the muscle cut away, and the track of the missile laid thoroughly open. The wound being held widely open with retractors, the surface of the track is cut away all round, from the inside, with scissors until all damaged muscle, as far as it is visible to the naked eye, is removed. Foreign bodies, clothing, or any small, loose fragments of bone are removed, all bleeding points ligatured, and the whole wound thoroughly swabbed out with soap solution. Muscles and fasciæ are closed with catgut and the skin sutured.

If the metal has passed almost through the thickness of a limb, it is removed by a counter-incision and the wound converted into a seton wound.

Both entrance and exit wounds are treated as above, and it is generally possible in this manner to expose and excise the whole track, one-half from each incision. In cases in which this has been impossible for anatomical reasons the center of the track has been well rubbed with gauze and soap.

If it only involved the division of a thin layer of muscle, the entrance and exit wounds were directly connected, laying open freely the whole track, which could then be dealt with. If there is gross loss of muscular tissue so that the ends cannot be approximated, or if a large dead space is left, the skin is sutured over the wound and a very small split rubber tube introduced for twenty-four to forty-eight hours.

In cases in which it is difficult to approximate the skin edges without undue tension one or more incisions may be made down to the deep fascia parallel to and at some distance from the wound. This occurs most often in the forearm and lower part of the leg.

Amputations have been completely stitched up with a very small split tube introduced into one corner for twenty-four hours. Penetrating wounds of knee-joints have been completely excised down to the synovial membrane, the joint well irrigated with soap solution, and the wound closed in layers.

The effect of the soap on the wound appears to be hemostatic. Instruments, needles, etc., tend to become somewhat slippery—a slight disadvantage.

During the last four months all cases in which it was possible have been treated by this method, but during one period of pressure it was impossible.

Patients have been kept on an average for ten days and then evacuted by barge to one general hospital.

It has been possible to follow the early history of all patients except a few who were unavoidably lost sight of during the period of pressure. The total number of cases was 116.

Out of a total of 98 cases in which the result was observed, 91 eventually healed and 7 failed altogether.

Out of 38 cases of compound fracture, 33 eventually healed and 2 failed.

A considerable proportion of cases healed dry without any discharge. In some there was a little oozing of slight superficial suppuration, necessitating removal of one or two stitches before they healed.

A few cases became very swollen, red, and shiny, about the second day, simulating acute cellulitis. The temperature rose to 102.3°, but the pulse as a rule remained below 100. After a day or two the swelling began to subside, redness disappeared, and the skin became crinkled, due to diminution of subcutaneous edema. These cases may cause alarm at first, but it is rarely necessary to remove any stitches. The pulse-rate appears to be the best guide.

In some cases in which the wound was gangrenous before operation a brownish discoloration appeared around the wound, and the part might even become tympanitic. On removal of one or two stitches gas and offensive discharge escaped, and the infection as a rule subsided.

Soap solution easily penetrates and comes into contact with the whole surface of the wound. It acts as a mechanical cleansing agent, washing away all débris.

Complete excision of a wound leaving an aseptic surface is possible only in superficial wounds and in superficial muscular wounds. It is impracticable in deep penetrating wounds, compound fractures, etc., on anatomical grounds, and it would also entail a much freer removal of tissue, which may impair future functional result. These latter cases, when treated by soap solution and primary suture, heal better than if an antiseptic such as eusol or bipp had been used. It follows from this that the tissues themselves are able to deal successfully with any infection which is left behind without the aid of any antiseptic. This point is particularly exemplified by those cases in which there is at first an intense local reaction following on the operation; it subsides as the tissues gain the upper hand.

Success depends on getting cases within a few hours of being wounded, before infective processes have spread far into the adjacent muscles, on the thorough removal of dead or grossly damaged tissues, and on the localization by *x*-rays and removal of any foreign body that may be present.

Compound fractures of the upper extremity always do well; only three cases of fracture of the femur have been thus treated, and of these two were successful, but the number is too small to warrant a definite opinion. It is necessarily the most severe type of case one has to deal with, but the results of those cases have been distinctly encouraging.

The advantages of primary suture are obvious: (*a*) Easy, rapid, and painless dressings; (*b*) time is saved for everybody once the patient has left the operating theater; (*c*) it is economical. The time taken in the operating theater is, however, con-

siderably longer, and this generally forbids the use of the method when the pressure of work is high.

One of the most important points is that no severe injury which has been stitched up should be evacuated for at least a week—first, because movement may just turn the balance during the early days of local reaction when the tissues are getting the upper hand and cause failure; and secondly, because when it is very difficult to decide whether the case should be opened up or not the operator himself is in a much better position to judge what is likely to be taking place inside the wound he has sewn up than some one else who gets the case later; consequently stitches remain which may otherwise be taken out perhaps through no fault of any one.

No opinion can be given as to the ultimate functional result as to bony union and action of muscles.

In those cases in which primary suture has been out of the question owing to gross loss of tissue, after the usual operative procedure the author uses a soap pack after the manner of the salt pack. It has been left in as a rule for five to seven days, and when taken out left a beautifully healthy wound.

REVIEWS.

A Manual of Clinical Diagnosis by Means of Laboratory Methods. For Students, Hospital Physicians, and Clinicians. By Charles E. Simon, B.A., M.D. Ninth Edition, Enlarged and Revised. Illustrated. Lea & Febiger, Philadelphia, 1918. Price $6.00.

Many sections of the present ninth edition of Dr. Simon's well-known book have been rewritten and much new matter and many new illustrations have been introduced. The subject-matter of the text is divided into two parts: the first dealing with technical questions, and the second with the collective presentation of the laboratory findings in the various diseases under their corresponding headings. The volume at present contains 851 pages, including the index, and no less than 207 engravings, with 28 colored plates, all of which latter are excellent, which is saying a good deal, as frequently colored plates illustrating laboratory methods are valuable in the original, but lose value in being reproduced.

The fact that the book has reached its ninth edition proves its great usefulness, for it is not often that a laboratory manual achieves such success. The book is one which every clinician, even if he is too busy to do laboratory work, will find it wise to keep at hand for the purpose of explaining reports made to him by laboratory workers and for the checking of these reports, and, furthermore, to give him a clear idea as to what he should expect when referring discharges from his patient to the laboratory man for study. If the reader is so fortunate as to have time to do laboratory work himself he will find the book an excellent working manual, since its author being in contact with clinical medicine, quite as much as with the laboratory, recognizes the needs of the general practitioner as much as he recognizes the needs of the specialist.

A Pocket Formulary. By E. Q. Thornton, M.D. Eleventh Edition, Revised. Lea & Febiger, Philadelphia, 1918. Price $2.00.

This book, which, although it contains nearly three hundred pages, is of such size that it can be carried in a coat pocket, contains a large number of prescriptions, which the author, who was at first a competent druggist and since has been for many years a competent practitioner of medicine, believes will give the best results in the treatment of disease. The diseases under which the prescriptions appear are arranged in alphabetical order. A list of important incompatibilities is given and a brief summary of the antidotes for various forms of poisoning. The new term milliliter has been employed instead of the older

and more familiar cubic centimeter in accordance with the custom of the last issue of the Pharmacopœia.

THE MEDICAL CLINICS OF NORTH AMERICA. January, 1918. W. B. Saunders Company, Philadelphia, 1918.

It will be recalled that early issues of the Medical Clinics of North America were prepared by clinicians in Philadelphia, Baltimore, and New York. This one is prepared by clinicians living in Boston and contains a larger number of contributions than its predecessors, no less than thirty-seven different articles being between the covers, a considerable number of which are illustrated. Some of the reports are in the form of question and answer, being taken directly from the clinic, with question on the part of the teacher and answer on the part of the student. The point which we think will be of considerable interest in this issue is the discussion of Vincent's angina, by Barnes, accompanied by a colored plate which shows the difficulty in differential diagnosis of diphtheria and Vincent's angina. In some respects the present issue is the best one which has appeared.

INTERNATIONAL CLINICS. A Quarterly of Illustrated Clinical Lectures, etc. Edited by H. R. M. Landis, M.D. Volume 1, Series 28. J. B. Lippincott Company, Philadelphia, 1918.

Readers of the THERAPEUTIC GAZETTE must be familiar with the character of International Clinics, either because they have seen in the Clinics themselves, or else because of their frequent mention in these pages. The present volume does not differ materially from its many predecessors. It opens with seven clinics, medical and surgical, given by different physicians in New York, Boston, Chicago, and Geneva, Switzerland. There are then three definite medical articles; two upon neurology; one upon public health; two upon surgery; and, finally, a general review of medicine of the year 1917 by Dr. Frank A. Craig and Dr. P. G. Skillern, Jr., which article covers almost one hundred pages. There are a number of colored plates and black-and-white illustrations in the volume, which add very materially to its interest.

TREATISE ON FRACTURES. By John B. Roberts, A.M., F.A.C.S., and James A. Kelly, A.M., M.D. Illustrated. J. B. Lippincott Company, Philadelphia and London, 1916. Price $6.

This excellent, timely, and modern work, profusely and admirably illustrated, clearly expressed, including all the later knowledge of the subject incident to the use of *x*-rays, demonstrating more recent appliances, such, for instance, as the Hawley table, the Lowman clamp, the Albee motor, has set forth this subject, sometimes regarded as hackneyed, in a so entirely practical and serviceable form that the busy surgeon, practitioner, and student, whether he has or has not other text-books dealing with fractures, will find himself in many instances more competent to deal with this class of injuries than he would have been without help of this book.

The section on Fractures of the Skull, Bones of the Face and of the Vertebræ are particularly to be commended for their clarity and sound common sense. In the text will be found embodied Roberts's well-known views concerning the subject of Fracture, and a most satisfactory and detailed description of the treatments commonly regarded as most serviceable by specialists in this line of work.

The book can be unreservedly commended as a valuable addition to the working library of the busy man.

THE THIRD GREAT PLAGUE. A Discussion of Syphilis for Every-day People. By John H. Stokes, A.B., M.D. The Mayo Clinic, Rochester, Minn. Illustrated. W. B. Saunders Company, Philadelphia and London, 1917. Cloth, $1.50 net.

In this book we have the subject so clearly, so rationally, so simply, and so scientifically discussed that it cannot fail to have a beneficent influence both on the populace and on the profession. The author states that the facts presented are the common property of the medical profession; that almost every sentence is written under the shadow of some advance in knowledge which cost a lifetime of some man's labor and self-sacrifice. The purpose of this book is to put the accepted facts in such form that they will more readily become

matters of common knowledge. He believes that by an appeal to those who can read the newspapers intelligently and remember a little of their high-school physiology, an immense body of interested citizens can be added to the forces of a modern campaign against the third great plague. The book entirely fulfils the purposes laid down by its author; and by its restraint and moderation, as by its forceful presentation, must command the support of all those having special knowledge of syphilis.

CORRESPONDENCE.

THE ADVANTAGES OF THE INFUSION OF SAW PALMETTO.

To the Editors of the Therapeutic Gazette.

SIRS: After carefully testing the effects of saw palmetto upon the prostate, both in specific and non-specific affections, the infusion has been found to give far better results than the fluid extract.

Patients, not knowing what they were taking, have claimed better results from the infusion. The fluid extract in some aggravated their prostatic soreness, whereas when given the infusion this gave relief. A change back to the fluid extract they noticed, and requested they be given the infusion.

The case that first brought this to my attention was in a bartender, who was getting over an attack of gonorrhea. He was given the fluid extract of saw palmetto. In a few days he brought the medicine back and said he could not take it, as it caused more pain in his prostate. He said there must be alcohol in it, as it affected him just like a drink of liquor; that even the smallest drink of an alcoholic beverage made his prostate more painful. He was then given the infusion, and this gave relief. His next bottle was of the fluid extract, and again he returned it. He was then given the infusion, from which he claimed relief, and requested that no more changes be made as he was satisfied with the infusion.

From this case others were tested; the results seemed conclusive that a strictly non-alcoholic medicine was better in prostatic affections.

The infusions have been made by putting three or four ounces of saw palmetto berries into a fruit jar, pouring onto them half a pint of boiling water, sealing the jar, and setting it where it will keep warm for ten or twelve hours. Pour this into a pint bottle, and then onto the berries pour another half-pint of boiling water, letting this stand a few hours. This is mixed with the first half-pint, squeezing out all remaining water in the berries, and if need be adding water to make a full pint of infusion. The dose is a tablespoonful before meals, thrice daily. It was found a preservative was needed, and five grains of salicylic acid was mixed with the berries, using more salicylic if desired to give a salicylate. This infusion will dissolve a maximum dose of the acid.

A. A. RADCLIFFE.

WAUKEGAN, ILL.

NOTES AND QUERIES.

THE RELATION OF PHYSIOLOGY TO MEDICINE.

A human being is far more than the mere organism with which medicine and surgery are immediately concerned. To a good doctor his patients, as fellow-men, have a value which cannot be measured; and he has constantly to deal with them on the human side and adapt his treatment to it. If he fails to do so he emphatically fails in his duty. In thinking of the scientific side of medical education we are sometimes apt to let the human side slip, and forget that an essential part of medical education consists of those subtle influences, exercised mainly by example, though partly also by special instruction, which teach sympathy with and understanding of human personality. If, therefore, medicine is to have more science and less rule of thumb, let us see to it also that with the science goes more humanity, and, where possible, a broader general education, not in the mere dry bones of the humanities, but on living humanistic lines.—HALDANE, *Edinburgh Medical Journal* for April, 1918.

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